

# COAL AGE

Vol. 3

NEW YORK, JUNE 7, 1913

No. 23

A time keeper who had been in the employ of a coal-mining company for three years, remarked on quitting his job that of the 400 men then enrolled on the company's pay sheet there were only 10 who were on the roll when he first entered service at that mine, although during all that time the average number of employees had been nearly constant.

Time keepers at most of our camps would have to make a similar statement if asked to investigate.

Coal miners are in demand everywhere; wages, living conditions and surroundings in general are pretty much alike at all mining camps, so why should a man remain at a place if he becomes dissatisfied? Of course it takes money to move, but if one's household possessions are few the money involved is a small consideration, especially to the average miner whose ability to value small sums of money hasn't been developed.

A little thought and investigation will convince most any one that the average miner could buy a cosy cottage with the money he wastes in moving, added to the loss of time incident to moving, during a period of 20 years.

What is being done to change these conditions? Much by the few, little by the many.

The few are beginning to realize that if a man's family can be induced to take an interest in a garden, a school, a church or a community, they will take enough interest in the man to see to it that he becomes satisfied with the community in which they live. Some have gone a step farther and arranged to reward a man for each additional year's residence in the camp; this appeals to the man as well as to the family and the interest aroused is spontaneous.

The most satisfactory system so far developed for accomplishing this, is to inaugurate old-age pensions with benefits directly proportional to the years of service preceding the arrival at the age limit. Upon the same principle, sick and accident benefits may be established whose benefits are governed by the years of service of the injured man. When interest is once aroused and the workers realize the benefits of such a system, it takes more than a misunderstanding with a driver or a drunken brawl with a "buddie" or a row with a check clerk to make a man pack up bag and baggage that he may try his luck in a new town.

To this plan of pensions one dissenting voice has been raised: John A. Fitch of "The Survey" objects to them on the ground that it gives the employer an unfair advantage over the employee in compelling him to remain at work *continuously* or lose the benefits of his years of service. To quote him: "This effectively prevents any stoppage of work as a protest against anything considered unjust by the workmen."

In trivial disputes, undoubtedly the pension would make itself felt, and its restraining influence would be beneficial to both employer and employee. In serious misunderstandings, however, its influence would probably be nil. "Give me liberty or give me death" is woven into the creed of too large a portion of Americans from all walks of life, to leave room for doubt as to what would occur if an unscrupulous employer attempted to ride roughshod over his employees.

# Semet-Solvay Coke Plant at Cleveland

By T. E. PIERCE\*

*SYNOPSIS—A description of the plant and methods employed for the production of a metallurgical coke with the recovery of such byproducts as gas, tar, ammonia and benzol.*

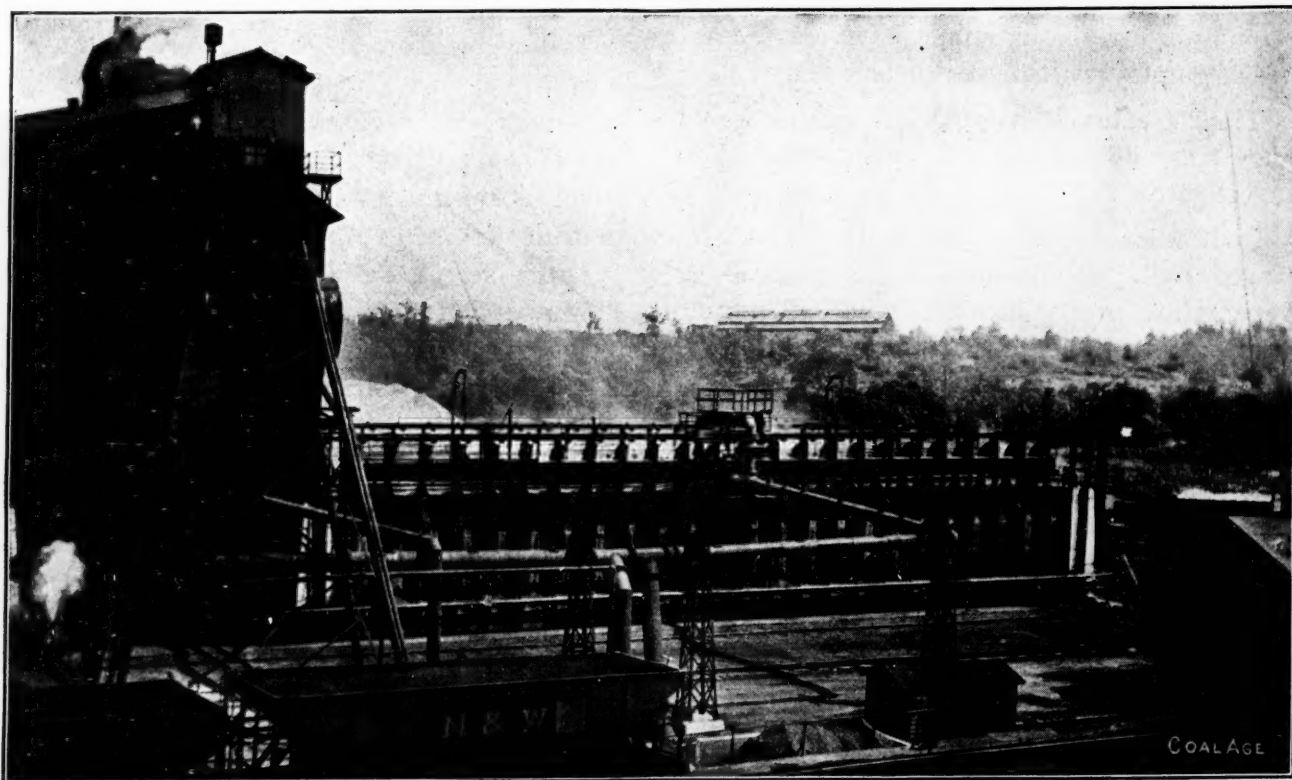
The Semet-Solvay Co., in April, 1909, entered into a contract with the Cleveland Furnace Co. to rebuild the coke-oven plant, which had been constructed about 1903 by Wilcox and Wagner, known at that time as the Retort Coke Oven Co. This plant had a series of irregular operations, which were never successful and in the fall of 1904, Dr. Rothberg rebuilt the ovens and the plant was run until about March, 1907, when it was shut down, as it was considered a failure.

The plant as rebuilt has 49 Semet-Solvay, silica-lined, recuperative ovens, known as the five-high, with neces-

imately 70 per cent. high-volatile coal and 30 per cent. of low-volatile Pocahontas. To insure against shortage in coal deliveries the Cleveland Furnace Co. carries a stock of from 20,000 to 35,000 tons, which is handled by their ore bridge.

The ovens are of the well-known Semet-Solvay type, the most characteristic feature of which is the system of horizontal heating flues in the oven linings which constitute the retorts. These are so constructed that they are entirely independent of the main structure of brick work and carry no load except their own weight. They can thus contract and expand independently of their surroundings and a single oven can be completely repaired while those adjacent to it are in full operation.

The ovens are heated by gas admitted to each of the top four flues through external pipes. The air for com-



A BLOCK OF BYPRODUCT OVENS

sary machinery for handling coal and coke, and apparatus for the recovery of tar, crude ammonia, gas and benzol. The capacity of the plant is about 600 tons of dry coal per day, producing approximately 430 tons of coke. This latter is used for metallurgical fuel by the Cleveland Furnace Co.

## HOW THE COAL IS HANDLED

All the coal comes in by rail and is unloaded at the track hoppers, from whence it flows to be crushed in a Williams hammer pulverizer and elevated by belt conveyors to the charging bin over the ovens. Due to a fire on Dec. 21, 1911, the coal-preparation plant is at present only temporary. The present practice is to mix approx-

bustion is preheated by the recuperation system underneath each oven. The waste gas, after preheating the air, passes to waste-heat boilers and generates some of the steam for the operation of the plant. The gas and air entering each flue are easily regulated, as is the chimney suction on each tier of flues.

Coal from the larries is charged through the holes in the top of the ovens and leveled by an electrically driven leveler carried on the pusher. The oven is sealed and the coking process proceeds undisturbed for from 18 to 20 hr., the gases passing to the collector main on top of the ovens. When this process is finished, the coke is discharged in a single operation by the pusher, and distributed in the sloping-bottom quenching car where it is quenched.

\*General superintendent, Semet-Solvay Coke Plant, Cleveland, Ohio.

The temperature of the oven flues is easily controlled at every point, thus insuring uniformity of product, which is essential in metallurgical fuel.

The easy control of the flue temperatures makes it possible to vary the daily production of coke and gas, excellent results being possible whether the coking time be shortened to 17 hr. or lengthened to 26 hr. or 28 hr. This flexibility of output is obtained without interfering with the uniformity of the product.

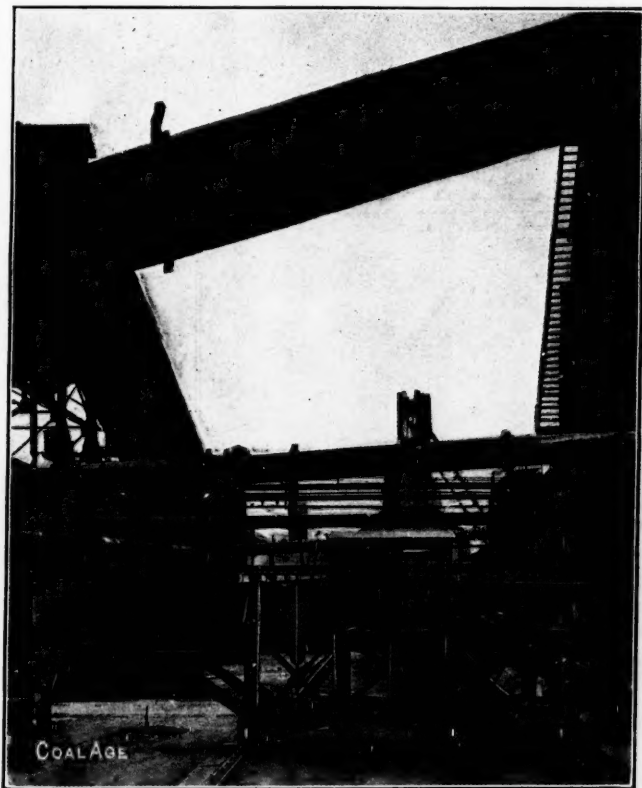
The horizontal-flue system makes it possible to maintain any desired temperature in the gas space above the coke without interfering with the complete coking of the coal. This is a matter of great importance, as the temperature to which the gas is exposed, after being driven

which may reasonably be required. At this particular plant however there is but a single main with no arrangement for separating the gas.

The gas from the hydraulic mains is first conducted to air-cooled condensers, thence to water-tube condensers and finally through an intermediate water-tube condenser. The exhausters are placed immediately after the primary gas condensers. From the exhauster the gas goes to the ammonia washer and from thence to the oil washer. This is a tower about 60 ft. high, with wooden grids, onto which oil is fed at the top. The gas, passing up through a shower of oil, is brought into intimate contact with this absorbent, which removes any naphthalene or other condensible hydrocarbons.

The benzolized oil is pumped to the light-oil plant where the benzol and heavier volatile oils are distilled off. The absorbing oil, after being debenzolized, is cooled and returned to the benzol washer.

The debenzolized gas is piped direct to the gas holder, and from thence to the fuel-gas distributing mains for heating at the ovens. The fuel gas going to each block of ovens passes through a Venturi meter, equipped with a recording device, which gives a continuous record of consumption.



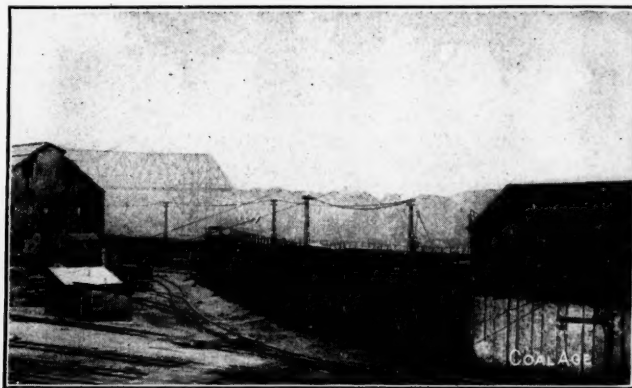
COAL CONVEYOR, GAS MAINS AND COKE-PUSHER WITH LEVELER ATTACHED

out of the coal, controls the secondary reaction, upon which, to a great extent, depend the quantity and quality of the gas and tar as well as the quantity of ammonia and benzol which may be recovered.

Semet-Solvay ovens are described as 4-high, 5-high and 6-high, depending upon the number of superimposed horizontal flues upon either side. The 5-high ovens at this plant hold nine tons of dry coal to a charge.

#### THE MANIPULATION OF THE GAS

The gas coming off in the early stages of the coking process is higher in both illuminating and heating power than that evolved later. At some plants there are two independent gas condensers and scrubbing systems, the one for rich and the other for lean gas. Double hydraulic mains are used, so arranged that the products of distillation from any oven may be turned at will into the rich or lean system. This makes it possible to keep the calorific power of the surplus gas very close to any standard



COAL TRESTLE AND TRACK HOPPERS

About 425 tons of coke are delivered daily in quenching cars to the Cleveland Furnace Co.'s bins; the cars being hauled direct from the ovens to the bins by a steam locomotive. The quenching apparatus spreads the coke in a thin layer, where it is quickly and thoroughly quenched by means of a large stream of water; this enables the production of a coke containing a low percentage of moisture. The quality of coke produced in these ovens is suitable for blast furnace and foundry purposes, whereas that obtained from the same coal in a gas retort is not adapted to these uses.

The byproducts, ammonia and tar, are recovered in the same way as from coal gas made in ordinary retorts. The quantity of gas and ammonia obtained from a ton of any given coal carbonized in Semet-Solvay ovens is somewhat higher than the quantity obtainable from the same coal when it is carbonized in horizontal or inclined retorts. The quality of tar is slightly different, as it carries less lampblack.

As the conditions of carbonization in a coke oven having horizontal heating flues are quite similar to those existing in a vertical retort, the results obtained with respect to byproducts closely resemble those secured with vertical receptacles of this kind.



# A New Device for Waste-Heat Recovery

BY A. T. SHURICK

**SYNOPSIS**—It is estimated that the annual loss sustained through waste heat from coke ovens is approximately 30 million dollars. This is undoubtedly one of the gravest menaces to the basic principles of true conservation there is. The apparatus here described introduces a novel innovation by bringing the boiler to the heat instead of the reverse, along which lines all previous attempts at solving this problem have been conducted.

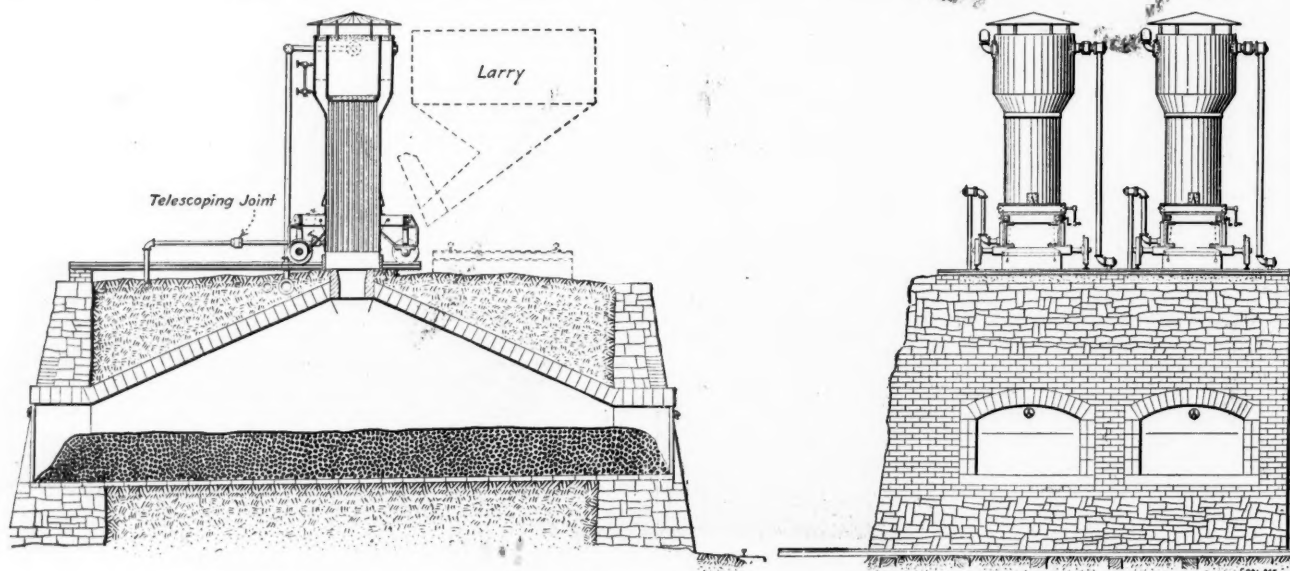
❖

Many different plans have been evolved for the utilization of the waste heat from coke ovens with varying degrees of success. One of the chief disadvantages has been the heavy first cost and the excessive cost of maintenance. Furthermore, most installations of this character have been found notoriously uneconomical, due to the excessive radiation in the flues, it being safe to say that not to ex-

rails act as a track on which the truck or frame work supporting the generators travels. Each truck is equipped with sprockets, chain and crank so that the generators can be quickly and easily moved from their position over the trunnel head and permit the charging of the ovens in the regular manner.

The question of maintaining an approximately constant water level in the large number of small boilers units is, of course, one of prime importance. E. C. Morgan, of Chicago, has proposed a method which consists of placing a feed water main, without static head, located on a level with the proper water level in the boilers and connected to each through pipe with swinging joints. The principle is that the pressure being equal in the boiler and feed-water main the water level will be the same.

It is believed that pre-heating the feed water can be ac-



LONGITUDINAL SECTION AND END ELEVATION, SHOWING APPLICATION OF APPARATUS TO THE MITCHELL OVEN

ceed 40 per cent. of the gross latent power available being realized.

## THE TITLOW APPARATUS

In the apparatus described herewith, the inventors have ingeniously overcome many of these difficulties by taking the boiler to the heat instead of *vice versa*. The illustrations shown herewith will give a very clear idea of the construction and method of operation. It will be noted that the generators are quite simple, being similar to the ordinary vertical boiler, less the usual equipment of stack, firing door, grate bars, etc.

The generators are mounted on trucks carrying a framework adapted to hold them in an upright position over the trunnel heads of the coke ovens. Ordinary T-rails are laid at right angles to the larry track, one on each side of the trunnel head, and are supported at one end on the foundation wall and at the other by the pillars or wall between each oven, thus avoiding any possibility of any weight resting on the oven itself. These

complicated by a direct-acting heater of special design on the principle of the economizer, permanently locating these heaters at fixed intervals, mounting and regulating them in the same manner as for the boilers. These heaters would be of the closed type, all being served by a common feed-water pump. If super-heated steam is required the boiler design may be easily modified to meet this demand.

One main steam pipe and one main feed-water pipe are suspended under the rails which carry the generator, and flexible connections are made between each generator and the main pipelines. Automatic feed-water regulators are provided with each generator and also non-return valves on the steam and water connections, so that when a generator is moved off the opening over the oven, it does not in any way affect the operation of the balance of the generators on that bank of ovens.

The steam pipe may be suspended outside of the foundation wall of the oven, if desired, but from actual tests it has been found advantageous to place both the main



water and steam pipes in the filling of the oven as it acts as a feed-water heater and also has a tendency to superheat the steam and prevent condensation in the pipes. When desired, a superheater for drying the steam may be placed in the top of each generator.

#### OPERATING EXPENSES AND RESULTS OBTAINED

Large batteries made up of these units can be taken care of by one man. With the arrangement outlined any number of generators may be connected to one feed-water supply pipe without regard to the variation in height of the different ovens. Also one steam pipe will carry all of the steam from a battery of generators direct to the power house.

As regards the efficiency of the apparatus, under practical working conditions, a thorough test of this was conducted at a coke-oven plant at New Salem, Penn. This test showed that each unit is capable of developing about 25-boiler horsepower, which in a modern turbine

taken into consideration, as well as the value or quality of the coke produced.

The largest saving from byproduct ovens is in the gas, which amounts to considerable in some territories where a reasonable price can be secured for it and sufficient demand exists. However, in the Connellsville region where the natural-gas resources are so great, it is doubtful if the gas produced from byproduct ovens could be sold except at a loss.

The tests already made have also demonstrated that these generators do not in any way affect the quality of the coke, but on the other hand it was found that an increase in coke yield was given, due to the perfect coking of the coal clear to the bottom of the oven, practically eliminating "soft ends."

#### REGULATION OF POWER AND COST OF INSTALLATION

The amount of heat utilized or power generated can be regulated by the number of steam generators placed in position for operation over the ovens. As it is the usual practice to charge one-half the battery of ovens on alternate days there is little variation in the total amount of steam generated per hour or day.

From equipment already purchased and quotations from various manufacturers, the inventors state that it will cost no more to install Titlow Waste Heat Generators and equipment than to construct and equip a regular generating plant of equal capacity. It is at least clear that with this apparatus there will be no boiler house, with its expensive equipment, to construct and maintain.

The cost for labor to operate the plants should be less than that of the regular generating plants, as there are no firemen to employ; one attendant should take care of from 50 to 60 generators; no ashes or cinders to handle, no expense for loading or unloading coal and no fuel to purchase.

❖

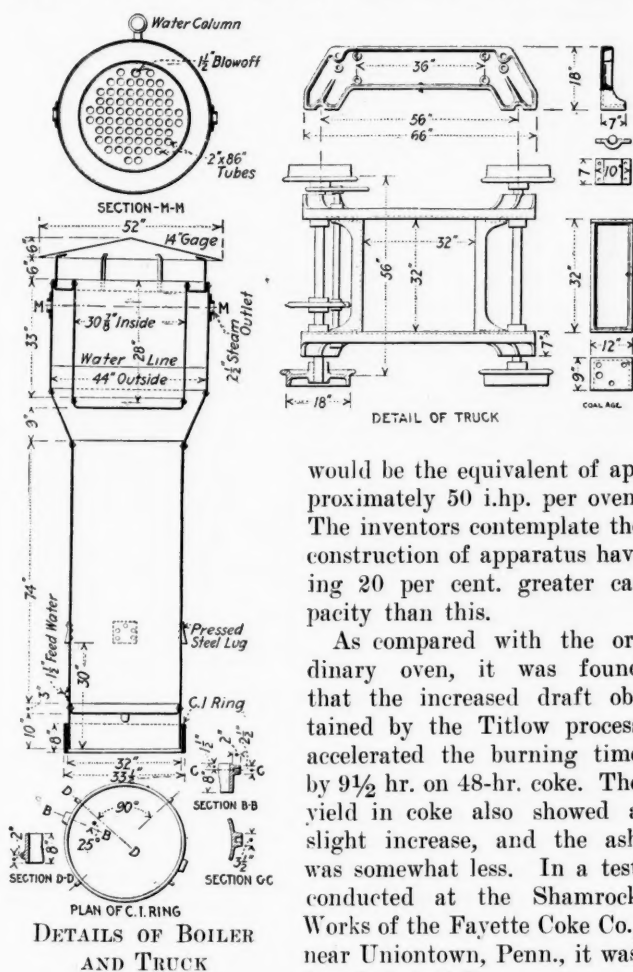
### The Effect of Knots on Timber

The accompanying table sums up the results of a series of tests made by the U. S. Forest Service, and published by them in *Bull. No. 108*. The tests were made to determine the effect of knots of different classifications on the crushing strength of certain varieties of timber. It will be noticed that in some cases the presence of knots seems actually to increase the strength.

RATIO OF RESULTS OF STRENGTH TESTS ON KNOTTY TIMBER TO RESULTS ON CLEAR TIMBER, STRENGTH OF CLEAR TIMBER TAKEN AS UNITY

	Compressive Strength at Elastic Limit per Sq. In.	Crushing Strength at Maximum Load per Sq. In.	Modulus of Elasticity per Sq. In.
Douglas fir:			
Pin knots.....	0.95	0.94	1.06
Standard knots.....	0.87	0.86	0.90
Large knots.....	0.78	0.78	0.71
Western larch:			
Pin knots.....	1.12	1.04	1.19
Standard knots.....	0.98	0.89	1.00
Large knots.....	0.98	0.85	
Western hemlock:			
Pin knots.....	0.96	0.97	1.00
Standard knots.....	0.94	0.91	0.97
Large knots.....	0.86	0.83	0.81

Pin knots are defined as sound knots  $\frac{1}{2}$  in. or less in diameter. Standard knots are defined as sound knots ranging from  $\frac{1}{2}$  to  $1\frac{1}{2}$  in. in diameter. Large knots are also sound knots from  $1\frac{1}{2}$  in. in diameter, up.



obtained in the boiler at the end of 30 min., after which it increased at a nearly uniform rate of 5 lb. per min., reaching 90 lb. at the end of 40 min.

#### COMPARISON WITH BYPRODUCT OVENS

It is believed that this apparatus will effect a recovery of 47 per cent. of the heating value of the coal charged into the ovens during the year, and it cannot but compare favorably with the savings of the byproduct oven. In addition to this the comparative cost of the latter and standard rectangular or beehive type of oven must be

# Connellsville Coke Selling Problems

By W. L. BYERS\*

***SYNOPSIS**—There is probably no other article of the industrial importance of coke that fluctuates in price over such a wide range. The variations in a year have been as much as 200 per cent. Investments in the Connells-ville regions have reached an enormous figure and costs of production are advancing rapidly. The demand for the product is erratic and herein lies the advantage of the large sales agency.*

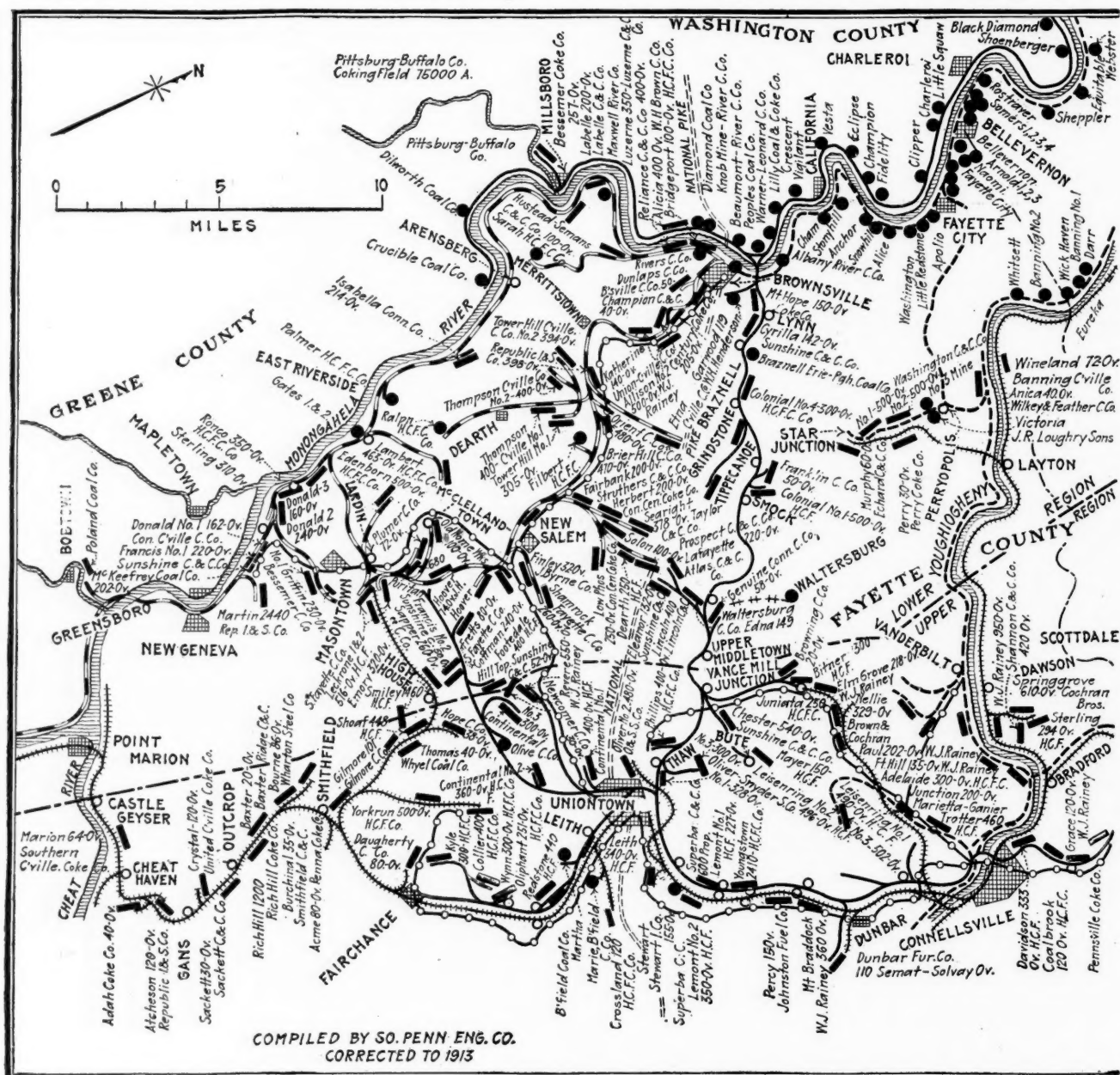
The independent or merchant ovens (those not allied with some consuming interest) of the Connellsville, Latrobe, Greensburg and Washington County Regions, can produce approximately ten million tons of coke annually. About eight millions tons of this is ordinarily sold for

blast furnace purposes and the remainder for foundry, heating and smelting purposes.

## DISTINGUISHING FEATURES BETWEEN THE UPPER AND LOWER REGIONS

By far the largest tonnage of blast furnace coke is supplied by the Connellsville Region which is divided into two divisions known as the Old Basin and the Lower Connellsville Region. The Old Basin Coal Fields are largely owned and operated by the United States Steel Corporation and the most of the merchant coke is supplied by the Lower Connellsville Region. The principal difference in the cokes is that Old Basin product is larger in size and higher in phosphorus than the Lower Connellsville Region, while the better grade of the latter

\*Sales manager, Producers' Coke Co., Uniontown, Penn.



A DETAILED MAP OF THE CONNELLSVILLE COKE REGIONS, SHOWING LOCATION OF RAILROADS.

is lower in phosphorus, ash and sulphur. The Lower Connellsville Coke is smaller in size but has equally good burden-bearing qualities or structure.

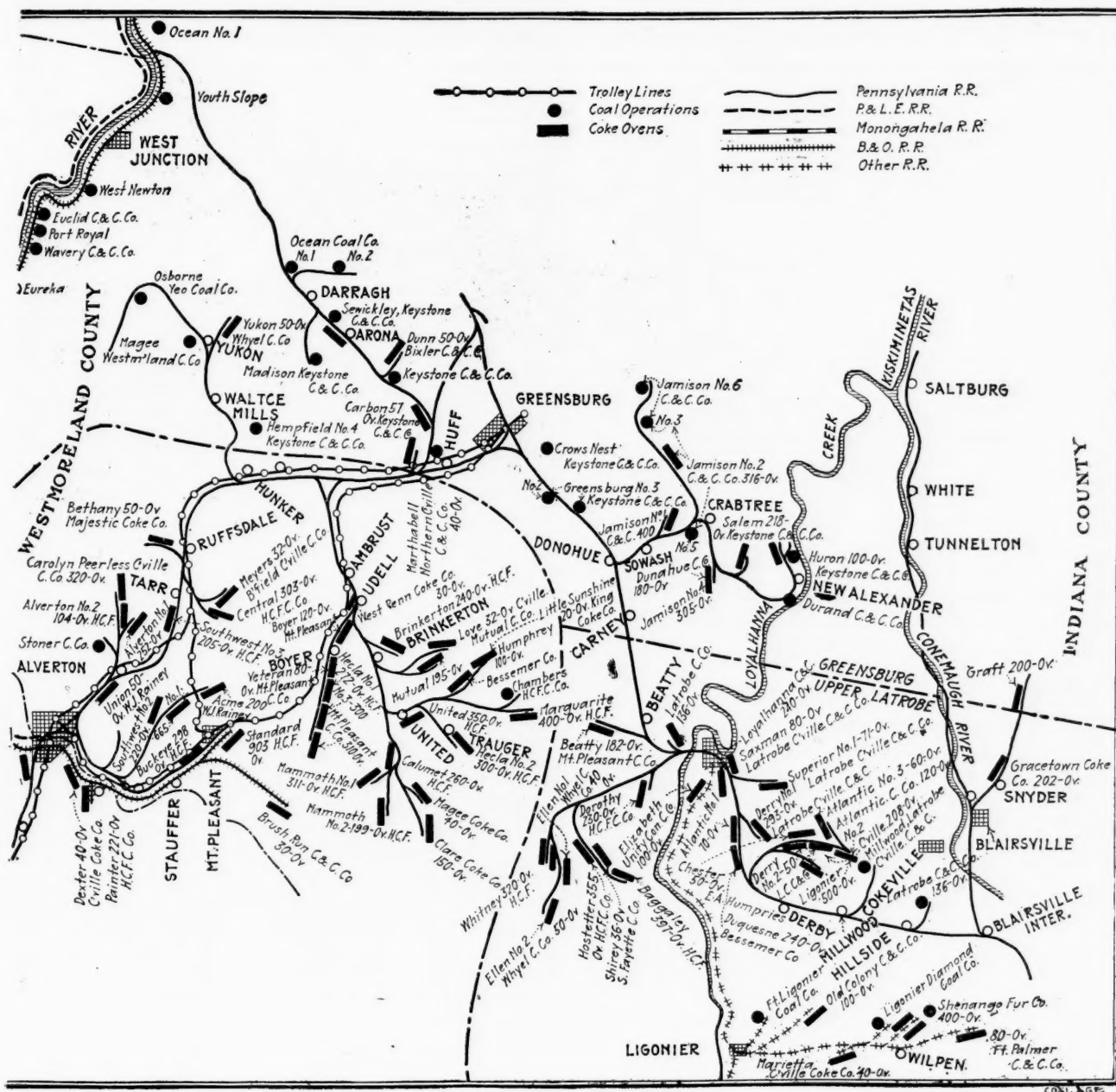
The terms size and structure are often erroneously confused and it should be understood that they are entirely different. Upon the cell structure of coke depends its qualification for bearing the burden in the furnace, but this has nothing to do with the size of the pieces. Uniform small-size pieces of strong cell structure give the best results in the furnace if thoroughly cleaned of ashes and breeze. Some concerns are now crushing coke to standard size for blast furnace use. The chemical specifications mentioned in sales of blast furnace coke are usually the Bessemer Limits of not over 12% ash, 1% sulphur and 0.02% phosphorus.

The largest tonnage of blast furnace coke is sold through sales agencies. Sales direct from producer to consumer would seem to be the logical method, but unless the producer has a large output, the sales agency gets

the better results. First, because the risk of shipment being suspended can be distributed over a greater number of furnaces with a large tonnage. A great many sales contracts are made subject to the operation of the furnaces; on account of accidents at the furnaces, the uncertainty of the life of linings, conditions of the iron market and many other unusual circumstances, the consumption of coke at the stack is more uncertain than the work at the ovens. Therefore, if a coke plant has a contract with one or two furnaces alone and they hold up shipment, the operations are either compelled to shut down temporarily at a heavy expense or go into the spot market. Whereas, if a sales agency has contracts with a number of furnaces, well scattered in different iron markets, it is improbable that they will all suspend operations simultaneously.

#### THE ADVANTAGES OF LARGE SALES AGENCIES

Sales agencies to be successful must be well financed



MINES AND COKE PLANTS WITH THE NUMBER OF OVENS, CORRECTED TO THE CURRENT YEAR



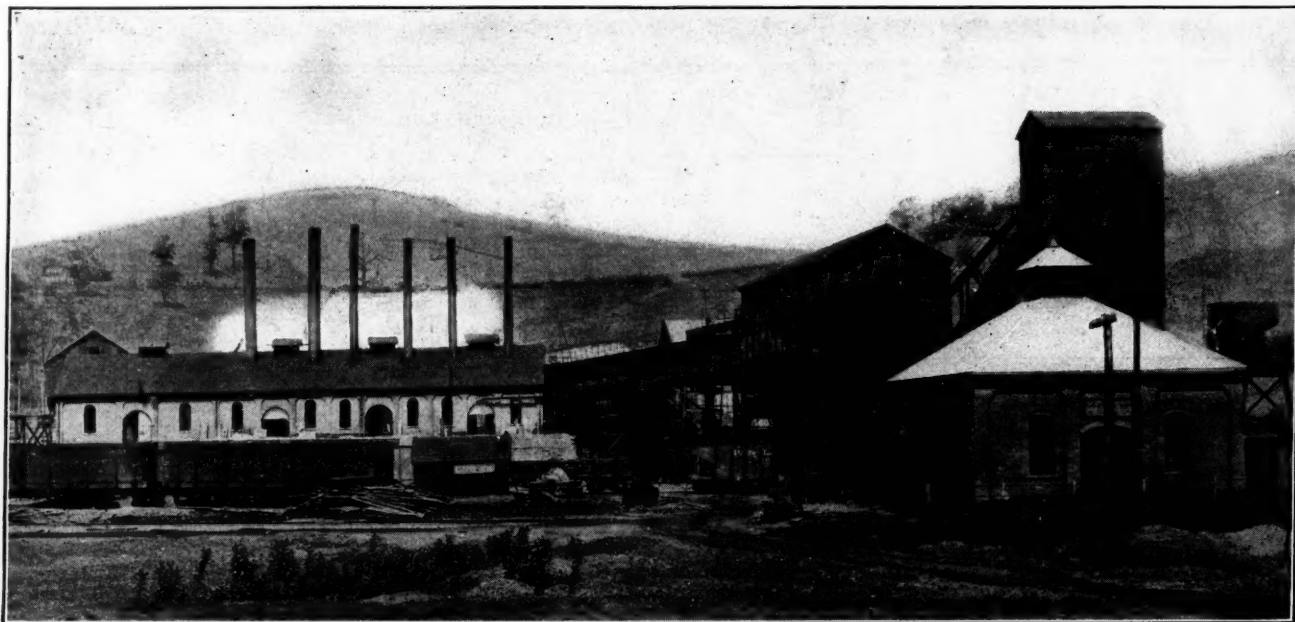
so that they can pay the operation promptly on the twentieth to the twenty-fifth of the month following shipment. The furnaces do not always pay promptly but as a rule the credits in the furnace coke business are good and the losses small compared to the volume of business. It often takes the output of two small operations to supply one large furnace with fuel while the furnaces usually want their contracts placed, for at least the entire requirements of one stack, with one source of supply.

Furnaces require heavier shipments in the fall and winter than in the spring and summer largely because of the slowing up of the movement of cars due to the advent of bad weather, and a consequent greater number needed *en route*, especially on long hauls. When the furnaces are not getting delivery, no matter how many cars they have *en route*, they order more coke and then

unloading. It is a wonder to the coke man they do not all do this.

The best furnace ovens do not make a practice of loading foundry coke. The foundries require selected 72-hr. coke, that is, the fronts and jambs taken out of ovens which have burned over from Friday until Monday, or, over an extra day during the week. This selection makes considerable coke which is not quite as hard and bright as the best and must either be sold as heating coke or put into the furnace grade, which is not fair to the latter, and the well posted furnace men will not buy what is left if they know it.

Smelters usually buy good structure coke, low in ash but not limited as to sulphur or phosphorus, although some smelting processes require regular blast furnace coke. Considerable smelting coke is shipped to the piers for vessels loading for points in Mexico and South America. A



THE WASHINGTON MINE, AT STAR JUNCTION, A TYPICAL CONNELLSVILLE SURFACE PLANT

hold up shipment when the weather becomes better and the railroads begin to gather up the stretch. A sudden change in the weather may make a difference of fifty to one hundred cars needed in transit for one concern to furnish a supply or avoid car service.

Foundry, heating and smelting coke is generally sold through local wholesalers near the point of consumption. The most insistent complaints come from these men. They apparently take the stand that for 35c. above the price of run-of-oven furnace coke, in open-top cars, they should receive the heart of the oven, on 72-hr. charges, carefully wrapped in tissue paper and loaded in box cars. They want it to look good enough to eat, no matter how it works in the cupola. Some will insist on the coke being 4 ft. long and 6 in. thick and then pay a man two dollars a day to break it up with a sledge. Others want it small but thoroughly polished. It not infrequently happens that one car is refused at a foundry and another accepted when both have been loaded at the same ovens the same day, side by side. Some of the big foundries now have solved the problem of costs and quality and buy high-grade run-of-oven 72-hr. coke loaded in open top cars and gondolas if they do not have trestles for

large trade in Pennsylvania and West Virginia coke is anticipated for smelting purposes on the western coast when the Panama Canal is opened. It is thought the freight rate will be lowered by \$4 per ton under the present all-rail rate.

#### COSTS OF PRODUCTION

The cost of making coke has been advancing constantly in labor supplies, coal land and plant construction. Although not generally known there has been an advance in wages in the Connellsville Region since the first of the year. Pit timber is becoming more scarce while oil, wire rope and all supplies are showing substantial advances. Good coal land is also becoming more scarce each year, and as most of the new development is now at considerable depth, expensive shafts and power equipment for handling the coal and water are necessary. Washers are being installed as the lower grades of coal are developed.

It now costs some modern plants 80c. per ton of coke in fixed charges for depletion of coal land, sinking fund for plant and equipment, interest, replacement and general expense which with a labor cost of \$1.20 and 20c.

for supplies makes the total \$2.20 net ton at the ovens.

The employers liability act now before the Pennsylvania Legislature, if passed, will add considerable to the present cost. One large mine explosion will put most of the present operators out of business. It is, however, excellent for the insurance people, who, it is understood, are pushing the bill.

In general it might be said that the capital invested in local coal land and equipment is enormous, and out of all proportion to the stability of the business. Plants with a fair coal acreage and oven capacity sufficient to supply one furnace frequently stand one million dollars and good-sized operations involve as high as seven million dollars capital. Sometimes they yield high returns but over a period of years the profits are not great.

The tricks of a trade are always interesting and the

furnace men and they are sometimes detected, which would be easily done if the furnace men would have their freight bills checked with their notice cards. By buying one good brand of coke and two or more inferior brands the brokers can often "sweeten up" and get business by being able to quote a lower price than first-class coke brings and hence furnaces frequently buy some inferior coke in order to establish a low price.

Speculation in the coke market is very hazardous. In an active market it has been known to advance 75c. a ton in one day and a fluctuation of 200 per cent. in a year is certainly greater than occurs in any commodity of like industrial importance. In a general way it follows the demand for steel but labor conditions plays a most important part since it constitutes about 55 to 65 per cent. of the gross cost of coke on board the cars.

❖

### Susquehanna Relief Funds

A new kind of benefit fund, in which the mine workers themselves contribute a percentage of their wages for one day and the operators the rest, is being successfully tried at three of the subsidiary collieries of the Susquehanna Coal Co. in the anthracite region of Pennsylvania. Usually the miners remain idle on the day of a funeral. At these collieries the custom has been instituted of having the men work and contribute 20 per cent. of that day's wages to a fund for the family of the deceased while the company contributes \$200.

The Susquehanna Coal Co. has had a relief fund in its main collieries at Mineral and Nanticoke ever since 1887, under which it pays out about \$20,000 a year. This fund, which is managed by the company free of charge, consists of a graduated scale of assessments on the wages of the mine workers who are members, the company contributing an equal amount.

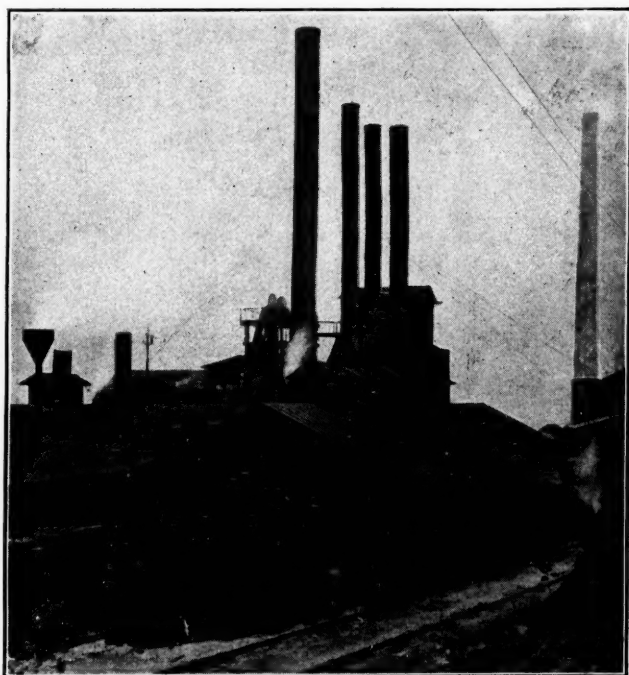
Membership is open to all employees, inside and outside, and the members are divided into four classes: Those receiving between \$2 and \$2.50 a day, those receiving between \$1.50 and \$2 a day, those receiving between \$1 and \$1.50 a day, and those receiving less than \$1 a day. Members of the first class contribute \$2.25, those of the second \$1.75, those of the third class \$1.25 and those of the fourth \$0.75. The contributions are assessed as needed.

In case of accidental death \$50 is paid from the fund for funeral expenses, \$3 a week to the widow for one year and \$1 a week for each orphan under twelve years of age for a like period. In case of accidental injuries, not fatal, \$6 a week is paid to members of the first class, \$4.60 a week to members of the second class, \$3.30 a week to members of the third class, and \$2 a week to members of the fourth class for a period of three months. No payment is made for injuries which do not incapacitate the member for a longer period than two weeks.

The existence of this relief fund for over two score years is the best recommendation of its value. The anthracite mine workers of Pennsylvania have a keen sense of perception and do not perpetuate any plan which does not work to their manifest benefit.

❖

What is claimed to be the largest steam turbine in existence today is being constructed by Messrs. Brown, Boveri & Co., of Mannheim. It is a 35,000-hp. unit and will be coupled to a generator. It is intended for the extension of the municipal central electric-lighting station in the town of Hagen.



BOILER PLANT AT THE H. C. FRICK COKE CO.'S  
LEISENRING NO. 2

coke business has a brand of its own. The oven owners say the coke brokers are all rascals, while the brokers retaliate by saying that the owners are farmers (*some* farmers, surely, as far as the capital is concerned). The brokerage business has in the past been profitable but with easy profit came also the greed which tempts men to overstep the bounds of honesty and fair dealing. Brokers at one time used to speculate on the producers coke under the conditions that if the spot price went above contract quotations, then the producer is compelled to ship the full tonnage, but when the reverse occurred only part of the tonnage would be taken. This has, however, about been discontinued and the producer now wants the profit if he takes the risk.

Brokers have frequently sold a brand of coke without either having the agency or any of the brand bought, expecting to get the order first and cover with the producer afterwards. Not infrequently they were caught and made to pay dearly for the coke or else they shipped other brands under the name of the one sold. Misbranding coke has frequently been practiced by the brokers on the

# Coke-Crushing and Screening Plants

BY F. W. HETZEL\*

*SYNOPSIS*—Typical coke-crushing and screening plant used in western Pennsylvania. It is designed for a capacity of 300 tons in 10 hr. and costs about \$3500 in place. Among the special features is feeding the elevator buckets directly, instead of into an elevator boot, which latter causes excessive wear.

❖

Within the past five years a number of cheap and efficient coke-crushing and screening plants have been built for various coal and coke companies in western Pennsylvania. These have usually been placed between the ovens and the shipping track, so that the coke can be wheeled

springs. They are provided with teeth, which, to resist the abrasion of the coke, are cast in chills.

## MECHANICAL DETAILS

The crushed material falls down into a collecting hopper, which, for greater durability, is sometimes lined with hard cast-iron plates. A chute or nozzle on this hopper directs the flow of coke into the buckets of a vertical elevator, care being taken in the design to deliver the material directly into the buckets and not into the elevator boot; this saves wear on the buckets, which would otherwise have to dig the coke out of the boot, and at the



FIG. 1. GENERAL VIEW OF A TYPICAL WESTERN PENNSYLVANIA COKE-CRUSHING AND SIZING PLANT

to the plant with a minimum of labor. These plants take the cleanup of the coke yard, or coke which is not salable for furnace or foundry use, and reduce it to the various sizes for domestic trade; or in case of delay in getting cars a portion of the total output can be crushed and elevated to the bins for storage. Fig. 1 shows such a plant and Fig. 4 gives a good idea of its construction. The crusher is usually set a little below the yard level for convenience in dumping in the coke. The crushing rolls are not large, 20 in. in diameter by 24 in. face being a common size and running at about 100 r.p.m. One of the rolls is fixed and the other backed up by

same time it avoids unnecessary crushing of the coke and the production of too much "breeze."

The elevators designed for this service must be simple and durable. The steel buckets are of the continuous type fastened to a strong chain which has hardened steel renewable pins and bushings. As a further precaution against wear and to insure long life to the elevator, the sprocket wheels are of the flint-rim type manufactured by the Link Belt Co., with rims and teeth cast in chills. In order to avoid making "breeze" the buckets are shaped so as to pour the coke out instead of throwing it. A steel chute leads the coke from the head of the elevator into the rotary screen; sometimes this chute is

\*Chief engineer, Link Belt Co., Nicetown, Penn.



made with a perforated bottom to take out part of the "breeze," but as the perforations are apt to clog with small bits of coke, it is better practice to leave all the sizing to the rotary screen.

To stand up to the work of sizing coke, a rotary screen must be properly designed and well built. The coke must be kept from contact with the working parts and from the parts which give strength to the screen. The perforated plates are made in sections and these are so arranged that they can be renewed without trouble by

taking out a few bolts. The usual practice is to take dust or "breeze" out through  $\frac{5}{8}$ -in. square holes, nut through  $1\frac{1}{4}$ -in. square, small stove through  $1\frac{3}{4}$ -in. square, stove through  $2\frac{1}{2}$ -in. square and egg over the end of the screen.

The frame of the screen carries two steel tire rings, which run on chilled rollers, these rollers being mounted on pedestals and base plates to hold them in proper alignment. If these are not properly held, there is unnecessary wear on the rollers and tires and it takes more power

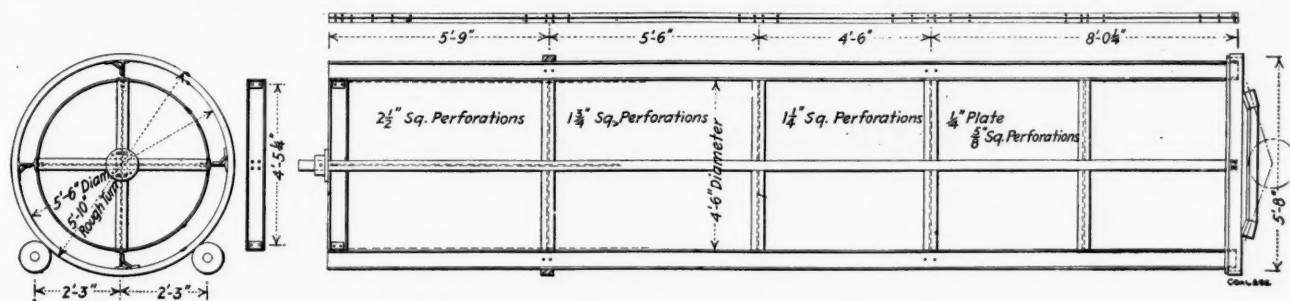


FIG. 2. DETAIL OF 24-FT., FOUR-SECTION, ROTARY COKE SCREEN

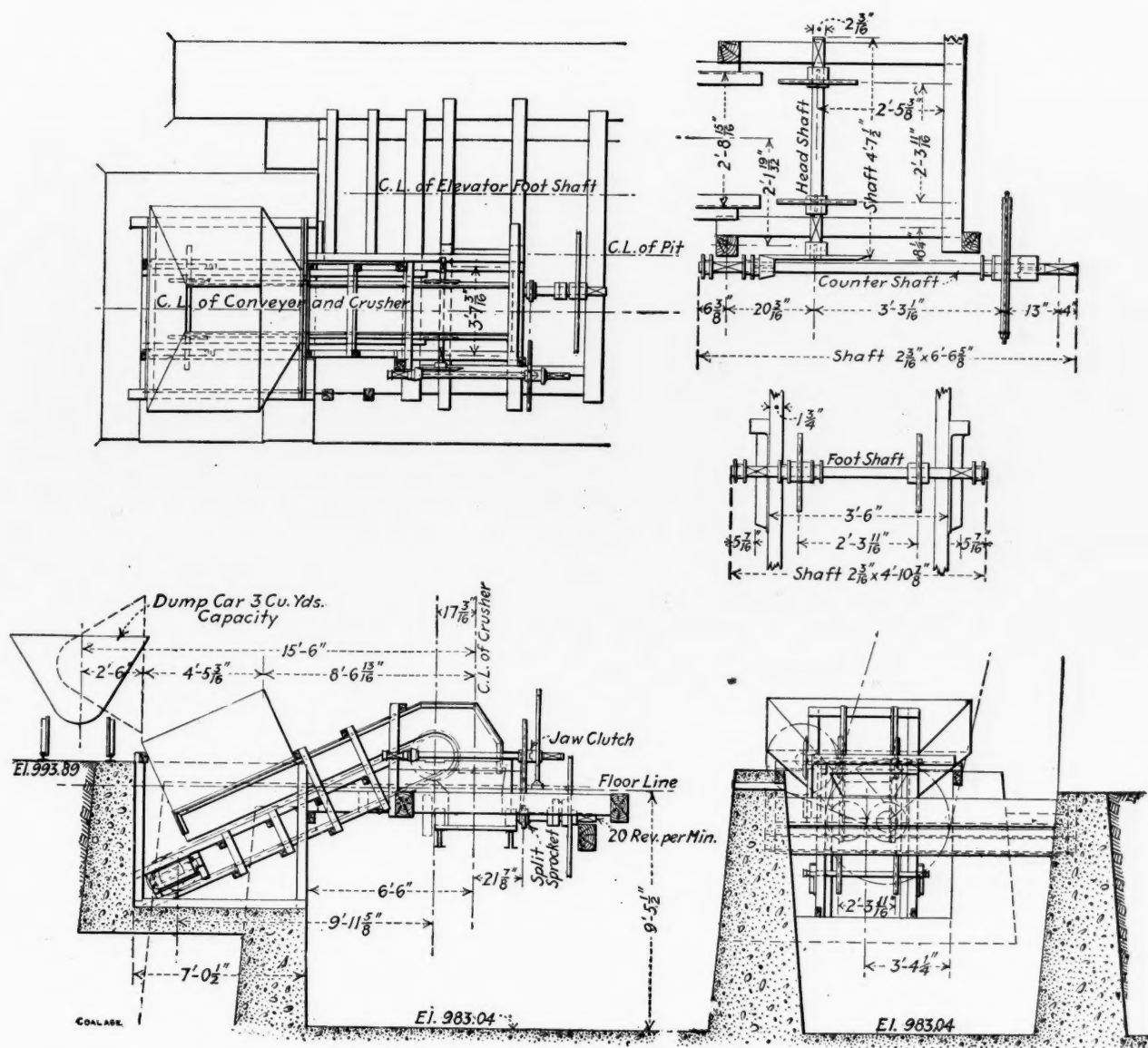


FIG. 3. DETAIL OF DUMP HOPPER AND 24-IN. APRON FEEDER

to drive the screen. The drive is usually by bevel gearing, the large gear being cast on one head of the screen; at the other end a thrust pin on the axis of the screen works in a fixed bearing and keeps the screen from running down hill. Fig. 2 shows such a screen 4 ft. 6 in. in

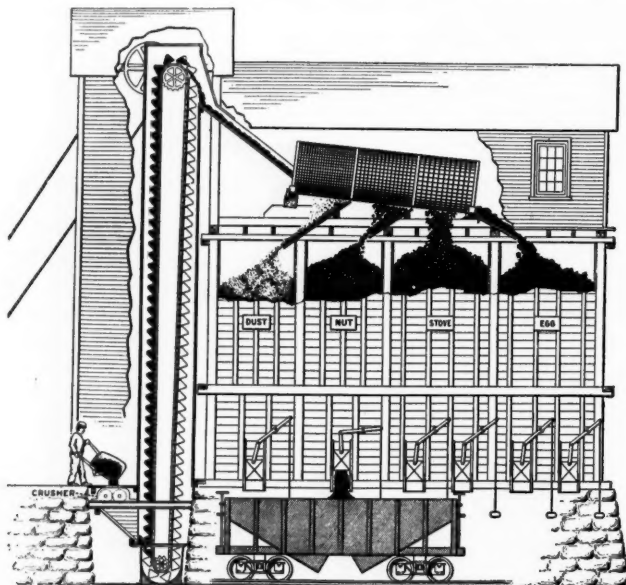


FIG. 4. SIDE ELEVATION, SHOWING METHOD OF SIZING AND LOADING

diameter by 24 ft. long adapted to make five sizes of coke and Fig. 5 shows a similar screen at work.

#### METHOD OF DRIVING

Referring again to Fig. 4 it will be seen that a single manila rope from the engine drives the whole plant, the rope running from the engine sheave to the top of the elevator, thence to the crusher and back to the engine through a tension carriage or slack adjuster. The screen is driven from the head of the elevator. This plan makes the driving simple and keeps the engine on the ground where it can be easily attended to.

In some plants the coke is received in side-dump cars, and to control the delivery from these cars to the crusher feeding conveyors are used. These consist of steel pans

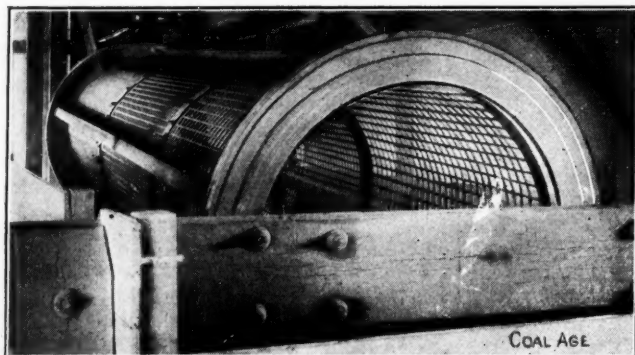


FIG. 5. VIEW OF THE REVOLVING SCREEN IN PLACE

attached to two steel roller chains running at slow speed. Fig. 3 illustrates such a machine. It is of advantage in permitting the cars to be dumped quickly and taken away and at the same time the regular delivery of coke

prevents the crusher from being overloaded. If the feeder is not used a jam of coke in the crusher may cause the spring relief roll to yield and this may pass coke uncrushed, hence the advantage of the feeder in getting a better crushing and sizing of the coke.

The feeding, crushing, elevating and screening machinery of such a plant has a capacity of about 30 tons per hour and costs about \$3500; when it is erected on a wooden structure with wooden bin it forms a low-cost, compact and efficient means of producing sized coke.

✱

## Permissible Explosives in Washington

Considerable progress has been made in the use of permissible explosives in this state, during the past year (1912).

In July, 1911, I took up with Doctor Holmes, director of the Bureau of Mines, the question of securing the assistance of the bureau in the effort to introduce permissible explosives into the mines of this state. Doctor Holmes detailed H. M. Wolfen, division engineer for the bureau in the northwest, instructing him to make a series of tests in several of the mines of the state. Much time and patience was expended in this work. As a result, the Roslyn Fuel Co. is today using permissible explosives exclusively, at their mines at Beekman. The Pacific Coast Coal Co.'s Coal Creek mine, at New Castle, and the Fairfax mine, at Fairfax, also use permissible powders almost exclusively.

Several other companies have used them at different times, but find it difficult to get the miners to adopt them. The miners claim that the use of these powders reduces their earnings. In the majority of cases, however, I do not think the miner has used the permissible powders long enough to thoroughly understand them. Another reason for their dissatisfaction is that a permissible explosive must be given a little more chance than the miner usually gives high explosives.

I sincerely hope that before long, nothing but permissible explosives will be used in the mines of this state; or, at any rate, that their use will be adopted in all gaseous or dusty mines. The following law, relating to powder and other explosives, was passed by the 1911 legislature:

#### EXTRACT OF WASHINGTON STATE MINING LAW

Be it enacted by the legislature of the state of Washington:

Section 1. Each person, firm, or corporation engaged in coal mining, requiring the use of powder or other explosives, shall provide (subject to the approval of the state mine inspector), at or near the entrance of each coal mine operated or at some suitable place near such work, a suitable distributing magazine for the storage of such powder or other explosives. There shall be posted upon such magazine a notice, printed in letters not less than 3 in. in height, that such magazine contains explosives. No person shall store or keep in any magazine mentioned in this section, any powder or other explosive in excess of one ton. In the case of coal mines, such powder or other explosive shall be issued daily, in quantities not to exceed the average used by each workman in one day, in proper receptacles. Any person or corporation violating or failing to comply with the provisions of this section shall be guilty of a gross misdemeanor.

Section 2. Any person who shall store or keep any powder or other explosive, in a quantity greater than 1 lb., in any occupied dwelling house or residence, or in any outhouse appertaining thereto within 300 ft. of any dwelling shall be guilty of a misdemeanor.

Note—From the advance sheets of the Report of the State Inspector of Mines, for 1912.

# Beehive and Byproduct Coke in Alabama

BY H. S. GEISMER\* AND DAVID HANCOCK†

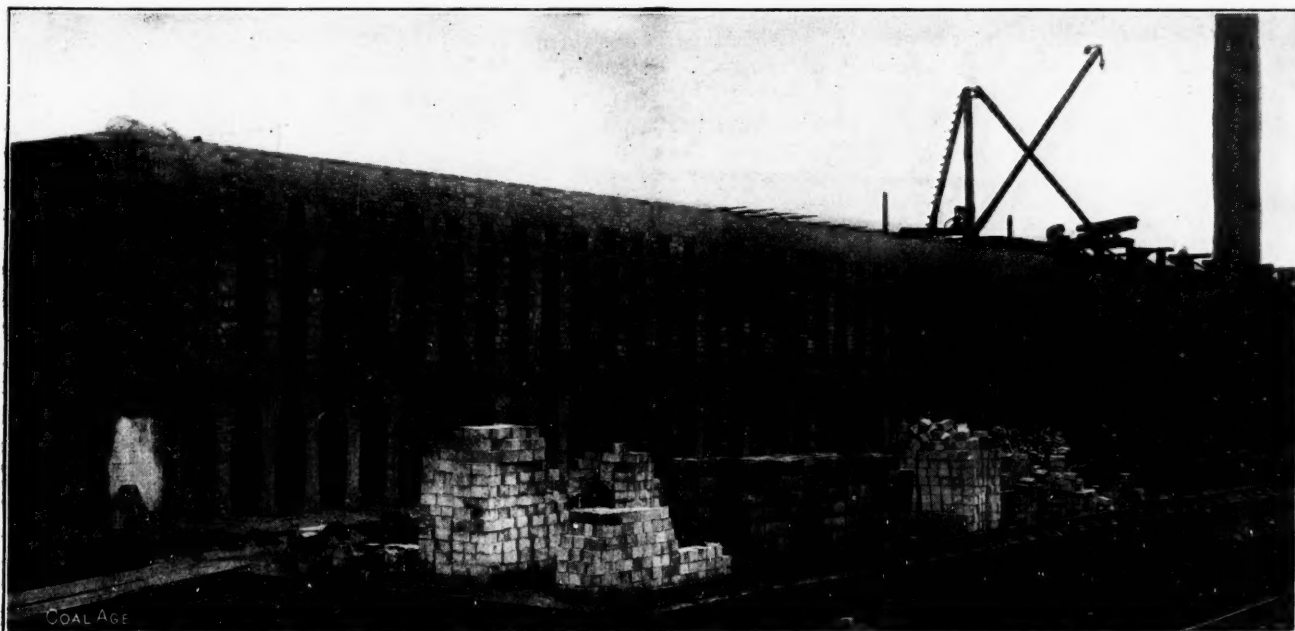
*SYNOPSIS—A statement of the quality and quantity of coke produced in Alabama and the coal from which it is made, together with a discussion of the washing of coal for the purpose of reducing the ash in the coke and the necessity for using dry coal for coking.*

In 1880 there were 316 coke ovens in Alabama and these ovens produced 60,781 tons of coke, which was consumed in the four coke blast furnaces then in blast in the state.

At the present time there are nearly 10,000 ovens of the beehive type in the state and 700 byproduct ovens, 420 of the latter being of the Koppers type and 280 of the Semet-Solvay type. In 1911, the last year for which statistics are available, the total coke production was

production follows closely the annual production of pig iron and incidentally follows the fluctuations in the pig-iron market, therefore, no great increase in coke production is to be looked for, but the rapid change from beehive to byproduct coke shows that the Alabama coke manufacturers are in the front rank of progress.

The coal used for coke making comes almost entirely from the Warrior coal field and from two principal seams of coal in that field. The Pratt seam was the first to be extensively developed in the state. This is a seam about 4 ft. thick, ordinarily, with one principal slate parting. It can be mined in a comparatively clean state and for many years mine-run coal from this seam was made into an excellent grade of coke. With the advent of coal washers it has become the general practice to crush and



EIGHTY NEW KOPPERS OVENS BEING BUILT AT WOODWARD, ALA., BY THE WOODWARD IRON CO.

2,761,521 tons and by far the larger portion of this coke was consumed by the blast furnaces of the state, a comparatively small portion going to foundries and to markets outside of the state. All but about 1000 beehive ovens are owned by companies operating iron blast furnaces.

The annual capacity of the 10,000 beehive ovens is about 5,000,000 tons, if all were continuously in operation, and the annual capacity of the 700 byproduct ovens is about 2,000,000 tons under the same conditions.

The completion of byproduct plants has put thousands of beehive ovens on the idle list and while no separate statistics are available at the present time there is no doubt that over 50 per cent. of the present coke production of the state is from byproduct ovens. There have been no beehive ovens built in the state since 1907, while 460 byproduct ovens have been built since 1907, and two additional byproduct plants are projected.

Since almost the entire coke product of the state, now, as in the past, goes to local blast furnaces, the annual

wash this coal, preparatory to coke making with the result that there is now made from this coal a quality of coke probably not surpassed by any blast-furnace coke in the world.

## SEAMS OF COAL BEING MINED

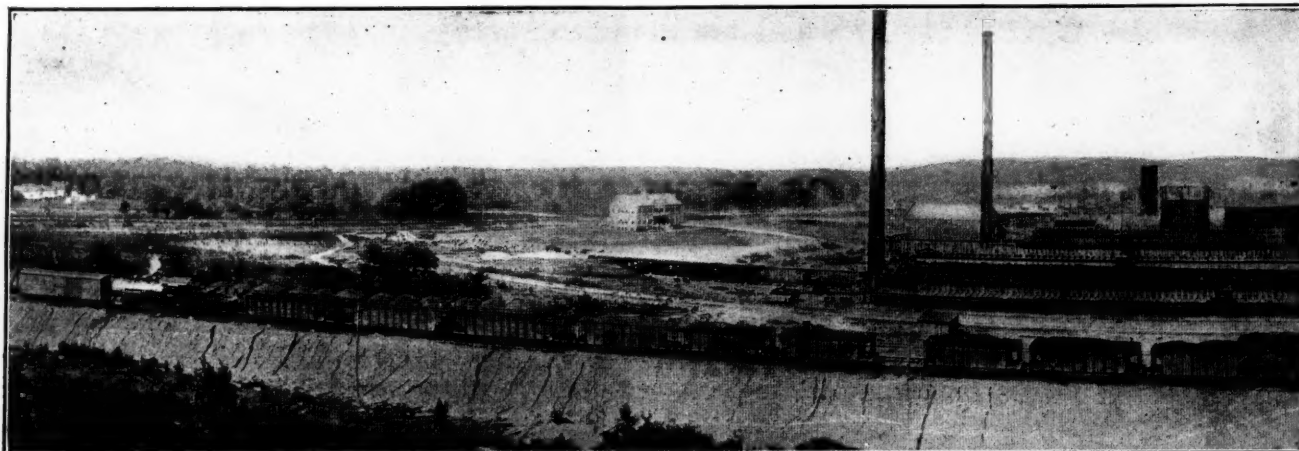
The Big seam of coal, locally known as the Newcastle, Horse Creek, Blue Creek, Mary Lee, Jagger, etc., all belonging to the same geological horizon, is now extensively mined and the coal made into coke. It is a dirty seam carrying numerous slate partings as well as irregular lenses of slate and requires washing to make a satisfactory grade of coke. With the improved coal-washing machinery now in use a good quality of coke is made from it, the coke being in many cases but slightly inferior to the Pratt. The Big seam is generally from 6 to 12 ft. thick, and, although the loss in washing is large, the washed product is produced at less cost than Pratt washed.

The necessity of washing the Big seam coal has led to a close study of the washing problem and to extensive ex-

\*Consulting engineer, Birmingham, Ala.

†Consulting engineer and chemist, Birmingham, Ala.





BYPRODUCT COKE-OVEN PLANT, KOPPERS SYSTEM, NEAR COREY, JEFFERSON CO., ALA.

perimenting. Three important washing machines, the Robinson-Ramsay, the Stewart, and the Montgomery were first tried out on a large scale in this state. Other types of coal washers have also been tried and are in successful operation.

As illustrating the extent to which coal washing has been introduced into the state it is interesting to note the character of coal used for making coke in 1911:

15.7 per cent. was mine run coal unwashed.  
29.2 per cent. was mine coal crushed and washed.  
0.1 per cent. was slack unwashed.  
55.0 per cent. was slack washed.

Slack is usually understood as comprising all coal smaller than  $2\frac{1}{2}$  in., though the practice is quite varied at different mines. Slack screens as small as  $\frac{3}{4}$  in. are frequently employed, as well as bar screens of  $1\frac{1}{2}$ -in. opening, which will pass a certain amount of material that will not go through a  $2\frac{1}{2}$ -in. round perforation. The coal over the slack screen is either crushed and mixed with the slack or else sold for fuel coal.

The location of coal washers in close proximity to the coking plant has brought forth a peculiar problem, viz., that of reducing the amount of water in the washed coal to a constant and satisfactory figure.

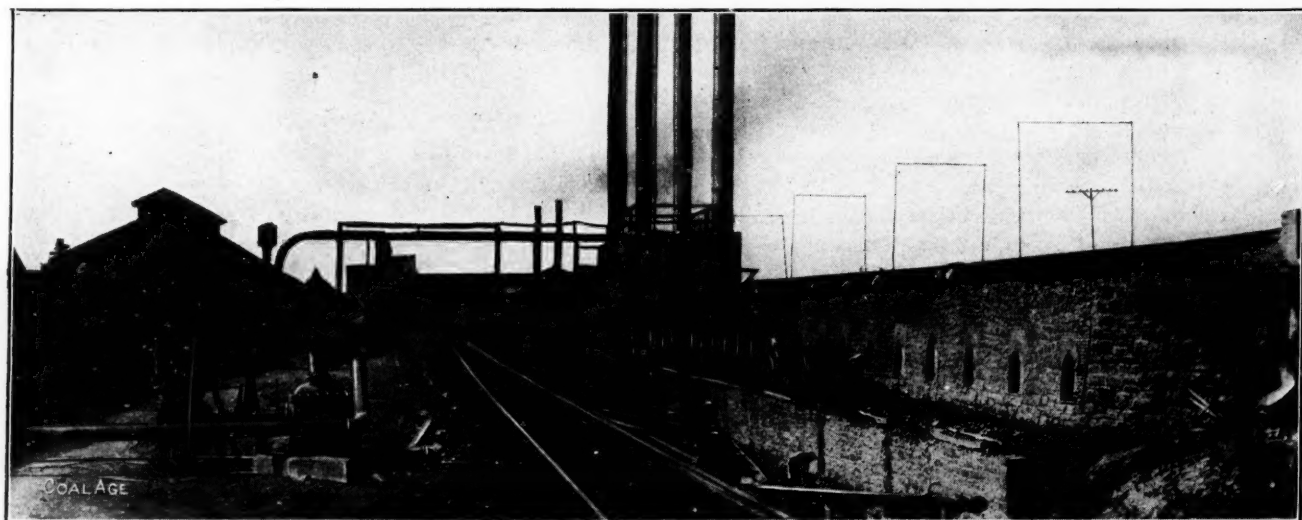
#### NECESSITY FOR DRYING THE COAL

The wet coal will contain from 1 per cent. to 13 per cent. of water and for some time after charging one can

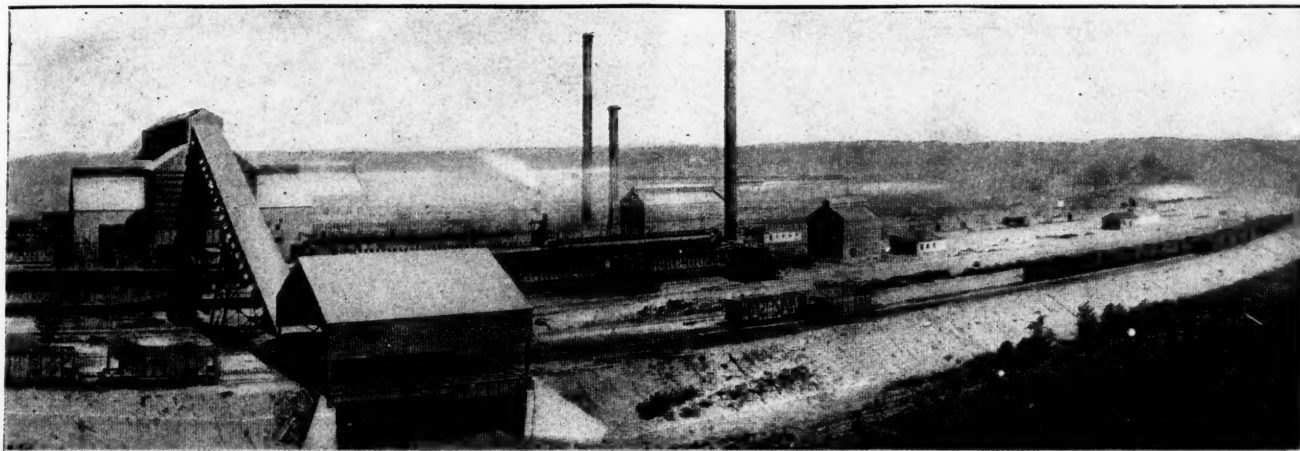
notice a considerable stream of water running out of the oven door. The oven is thereby chilled and often the yield of coke as well as the quality is affected. Also, the variable quantity of water makes it impossible to keep accurate records of the tonnage of coal charged and consequently no reliable figures as to yield of coke can be compiled. This trouble has been obviated to some extent by allowing the coal to stand in cars or in large storage bins for 24 to 36 hr. before charging into the ovens; in this way a fairly constant though still somewhat uncertain quantity of water is retained in the coal. Experiments on an extensive scale have shown that on an average about 5 per cent. of water is retained in the coal after standing for about 36 hr. This percentage is influenced to some extent by size of the coal, but is fairly constant for coal coming from the same washer.

Recently a centrifugal dryer has been placed on the market by the American Concentrator Co., that will handle 50 tons of washed coal per hour containing 13 per cent. of water and reduce this uniformly to 5 per cent. These machines will be given a try out in the Birmingham district in the next few months.

The average yield of coke from Alabama coal in 1911 was 62.6 per cent., recent years having shown an increase from about 59 per cent. The increase is due largely to the increased percentage of byproduct coke, the yield



UTILIZATION OF WASTE HEAT FROM BEEHIVE OVENS



SHOWING PROPERTY OF THE TENNESSEE COAL, IRON &amp; RAILROAD COMPANY

from Pratt and Big Seam coal in beehive ovens being still about 59 per cent. Yields lower than this are found on individual plants and are generally the result of inefficient supervision of the coke-oven operation, variations in the size of the charges, poor drafting and daubing, leaky oven doors, imperfect or slow sealing of the ovens after burning in, etc.

Systematic records so placed that they are available and intelligible to the foremen in charge generally result in noticeable improvement both in quality and yield.

The yield on byproduct plants is much higher, averaging around 70 per cent., though the screening operations which are necessary for preparing a suitable coke for blast-furnace use, by removal of a large amount of small coke, reduce this figure somewhat. Probably 66 per cent. would be a fair average for the yield of screened coke at the byproduct ovens of the state.

It is often erroneously assumed that the analysis of a coking coal will give exactly the yield which may be expected from it, by simply computing the total of ash and fixed carbon; a corollary to this fallacy is often worked out by which the ash of coke is computed by dividing the ash of coal by the known per cent. of yield. Such calculations neglect entirely the variable production of ashes and breeze at the ovens.

A test made at one of the Alabama coke plants shows a very peculiar condition, as well as the danger of mak-

ing such assumptions as those mentioned. At this plant a very regular coke product was being made and analyses of the coke over a long period showed an average of 14.50 per cent. ash, and a yield of about 60 per cent. The coal used was Big seam washed and ran regularly 12 per cent. ash. This coal theoretically would produce coke running 20 per cent. ash instead of 14.50 per cent. It was decided to investigate this, so two ovens were selected for the test and a tight floor built in front of them so as to retain all ashes and breeze. The coal charged into the ovens was weighed and analyzed and everything from the oven after a 72-hr. coking period was also weighed and analyzed.

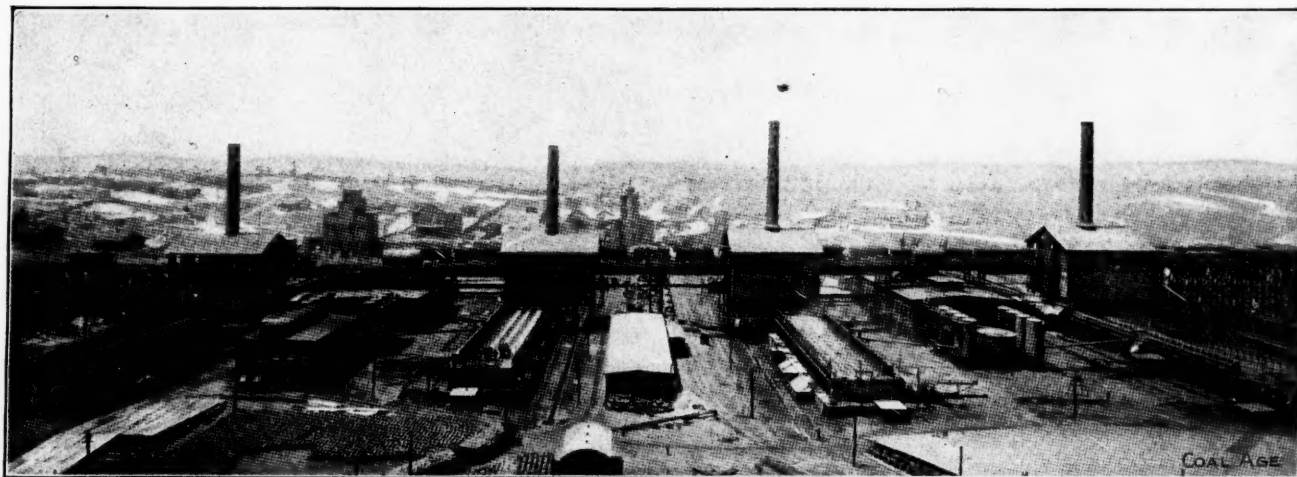
#### ASH CONTENT OF THE COKE

The following results were obtained (per cent. of original dry coal):

60.6 per cent. screened coke, ash contents.....	14.56 per cent.
2.6 per cent. dry breeze, ash contents.....	31.56 per cent.
4.1 per cent. dry ashes, ash contents.....	49.34 per cent.

The amount of ash represented by these products was then calculated to be 11.72 per cent. of the original weight of coal (dry basis), while the analysis of the coal before charging showed 11.90 per cent. ash.

The explanation of this is that with this particular coal, the ash-forming impurities are to a great extent noncoking, and in some peculiar way are segregated from the coke during the coking operation and appear in the



SEMET-SOLVAY BYPRODUCT COKE-OVEN PLANT, ENSLEY, JEFFERSON COUNTY, ALA.



910 BEEHIVE COKE OVENS AT THOMAS, ALA., LARGEST GROUP OF OVENS IN THE SOUTH. OWNED BY THE REPUBLIC IRON & STEEL CO.

form of an unusual amount of ashes at the oven instead of going into the body of the coke. This action probably takes place to a greater or less extent with all coking coals, and, unfortunately, makes it impossible to determine in advance of actual trial to what extent reduction of ash by improved coal washing would be reflected in the reduction of ash in the coke.

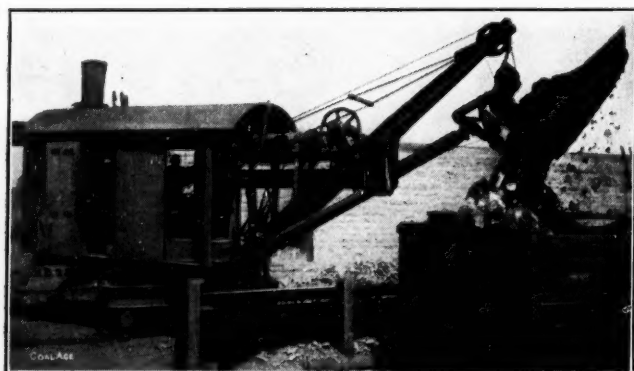
For instance, in this case improvements in the coal-washing plant were contemplated, amounting to about \$60,000, by which it was expected to reduce the ash of this coal to about 8.5 per cent., but in view of the results shown by the test it was concluded that no lowering of the ash of coke would be effected thereby, but only a diminution of the amount of ashes made at the coke-

The above are representative figures from the records of operating companies and are averages of many separate results. All are on coke produced from washed coal in beehive ovens. Byproduct coke is usually superior to beehive in density, but does not have the silvery bright appearance characteristic of good beehive coke.

The products obtained from the byproduct ovens of the state with Pratt coal will run on an average about as follows:

Screened coke.....	66 to 70 per cent.
Breeze and small coke.....	6 to 4 per cent.
Ammonium sulphate.....	20 to 25 lb. per ton of dry coal
Gas.....	9,000 to 10,000 cu.ft. per ton dry coal

About one-half of the gas is needed for heating the ovens and the balance is either wasted or used outside of

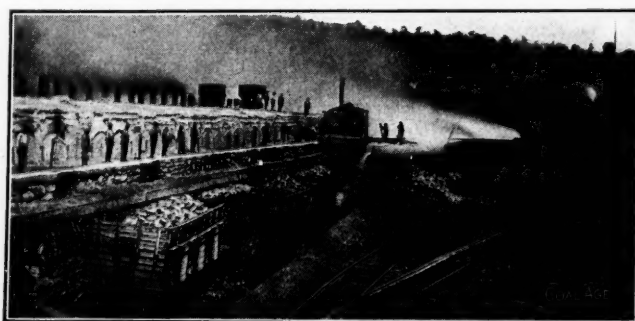


STEAM SHOVEL LOADING COKE

oven plant, and the only saving would be the saving in expense of disposing of the ashes.

Many analyses and physical tests of Alabama coke have been published from time to time, some of these were of special samples, some others from locations not typical of the district. The writers believe that the following analyses and physical tests represent a fair average of the quality of the coke produced by the principal operations on the Pratt and Big Seam:

(Dry basis)	Pratt Coke	Big Seam Coke
Volatile matter.....	0.96	1.27
Fixed carbon.....	91.34	84.64
Ash.....	7.70	14.09
Sulphur.....	1.33	0.73
Physical tests:		
Apparent specific gravity.....	1.30	1.00
True specific gravity.....	1.92	1.63
Per cent. of cells by Vol.....	36.0	43.0
Ultimate strength per sq.in.....	1600	1400
Load strength (factor of safety 4)...	450	425



THOMAS TYPE OF COKE OVENS AT COALBURG, ALA.  
PROBABLY FIRST MECHANICALLY DRAWN  
OVENS IN UNITED STATES

the coke plant. The saving, which can be accomplished by coking in the byproduct oven in this state, depends very largely upon the use which can be made of the surplus gas.

### Erratum

On p. 766 of our issue of May 17, in the first paragraph of the article entitled "An Effective Slate Picker," the following statement is made: "The accompanying photograph shows a Mason & Allen flat slate picker handling material containing 20 to 32 per cent. flat slate, etc." This should read "handling material containing 20 to 22 per cent. flat slate, and rejecting 18 to 21 per cent. in the process."



# Improving Coke from Beehive Ovens

BY NEWELL G. ALFORD\*

**SYNOPSIS**—An article suggesting lines for the practical investigation of the causes for the variation in the quality of the product produced in beehive coke ovens, and the means for maintaining a uniform product.

✱

To standardize operating methods about a beehive coke-oven plant is a problem which superintendents and managers find themselves periodically facing. Of course, this applies best to operations where a "coke inspector" is not overseeing the work and consulting with the coke boss. This overhauling of operating methods is apt to involve the personal supervision of an engineer or one higher up, and offers material for a lengthy article. Therefore, only the more common difficulties are dealt with in this short article.

To begin with, the distress is likely to start with some sultry letter addressed to the general superintendent in somewhat this tone.

Dear Sir:

We beg to advise that the last two consignments of coke received from your ovens are far from satisfactory. Our laboratory analyses show that the fixed carbon for the past week has been averaging 78% instead of the 84%, which you guaranteed in our contract. Unless your coke is brought up to this latter figure at once, we shall be forced to make other arrangements for our furnaces.

The general superintendent, of course, gets the gist of the letter in one reading and summary action follows. Needless to say, an interesting bit of dialogue ensues between the superintendent and the coke boss. For the sake of discussion let it be assumed that the letter to the superintendent was a true statement of facts.

Inspection reveals that the moisture in the coke may be noticed in touching it, an inch or more of "black butts" marking the ends of the lower sections, while the color is a dirty gray and the cell structure spongy.

If the coal used in charging the ovens analyzes the same as it did when better coke was produced, it is safe to lay the cause of the trouble to the oven operation. Under these conditions the coke described above is usually the result of cool ovens, together with insufficient combustion. The analysis of the coke will, therefore, show high moisture and volatile matter with a low fixed carbon.

It is understood that a cool oven will produce a slow ignition and feeble combustion of the coal with which it is charged, and that it will require a longer time to complete the burning than an oven which was hotter at the start.

Overquenching the coke not only injures the coke but destroys a certain amount of the heat that would be available in the bottom tile of the oven, in order to start the combustion of the next charge of coal. The heat destroyed varies with the temperature of the bottom tile before the coke is quenched and the amount of excess quenching.

## INCREASING HEAT OF OVEN

After the coke has been drawn the first step is to raise the heat in the oven preparatory to charging the coal.

\*Assistant chief engineer, St. Bernard Mining Co., Earlington, Ky.

Radiation and reflection of heat from the dome and floor are contributory elements for regaining heat. Following the drawing of coke from an oven, pieces of coke varying in size from chunks to breeze may be seen on the oven floor where they have been left by the puller. Good practice has shown that sweeping the oven floor clean with a steel broom will aid in the radiation and increase of heat.

To increase the heat the oven must be closed by placing a sheet of iron snugly in the oven doorway and the lid on the trunnel head. This not only excludes the outside air but hastens the rise in temperature, so that after standing an hour and a half or two hours in this state before charging, the inner temperature will have risen from approximately 150 deg. F. to 600 deg. or thereabouts.

With the oven ready for charging, further features of interest are brought to notice. When the sheet iron and lid are removed, the dazzling of heat can be seen within, while, perhaps, the bricks in the dome may be tinged with an orange glow. If dry coal is charged, gas may be generated so readily that a slight explosion may take place, and a streak of flame be emitted from the top of the oven door. This is a good indication, as it signifies quick combustion, the very result desired.

However, if washed coal is being used in the ovens, another difficulty is likely to arise. The benefits derived from sealing an oven and letting it stand over between charges can be entirely effaced by charging coal which is too wet. Unless dried after washing, coal is scarcely ever fit for charging into the ovens the same day that it comes from the washer. If there is more water present in the coal than the heat of the oven will evaporate before the coal ignites, the same result will be obtained as in the case where the oven was too cool before charging.

## SIZE OF CHARGES

Another feature well worth considering is the size of the charges. There are two or three gauging devices for sale which measure the discharge from the slack bin into the larry, which insure a standard charge for all ovens burning the same length of time. One of these devices, known as the Hughes Patent Charge Cutter, can be set to gage correctly for any charge varying from 48 to 96 hours per oven. This charge-measuring machine is in successful operation at the plants of the Wise Coal & Coke Co. and the Colonial Coal & Coke Co., both of Dorchester, Va.

Tests should be made upon the ovens to determine the exact size of the charge which burns off best in a given period, the determination to be governed by analyses. By coupling the results of such tests with the use of a charge gager, underburning and overburning of the coal may be avoided.

Underburning, on the one hand, produces coke such as that described in the hypothetical case at the beginning of this article. Overburning, on the other hand, results in the waste of fixed carbon, and yields as well a brittle coke.

## QUENCHING THE COKE

The quenching of coke is an important department of the process. Where coke is drawn with electric-pulling machines, quenching is usually done by one or two men. But where this is not the practice, the watering is done by the pullers, and, consequently, a variety of quenching methods are apt to be in vogue.

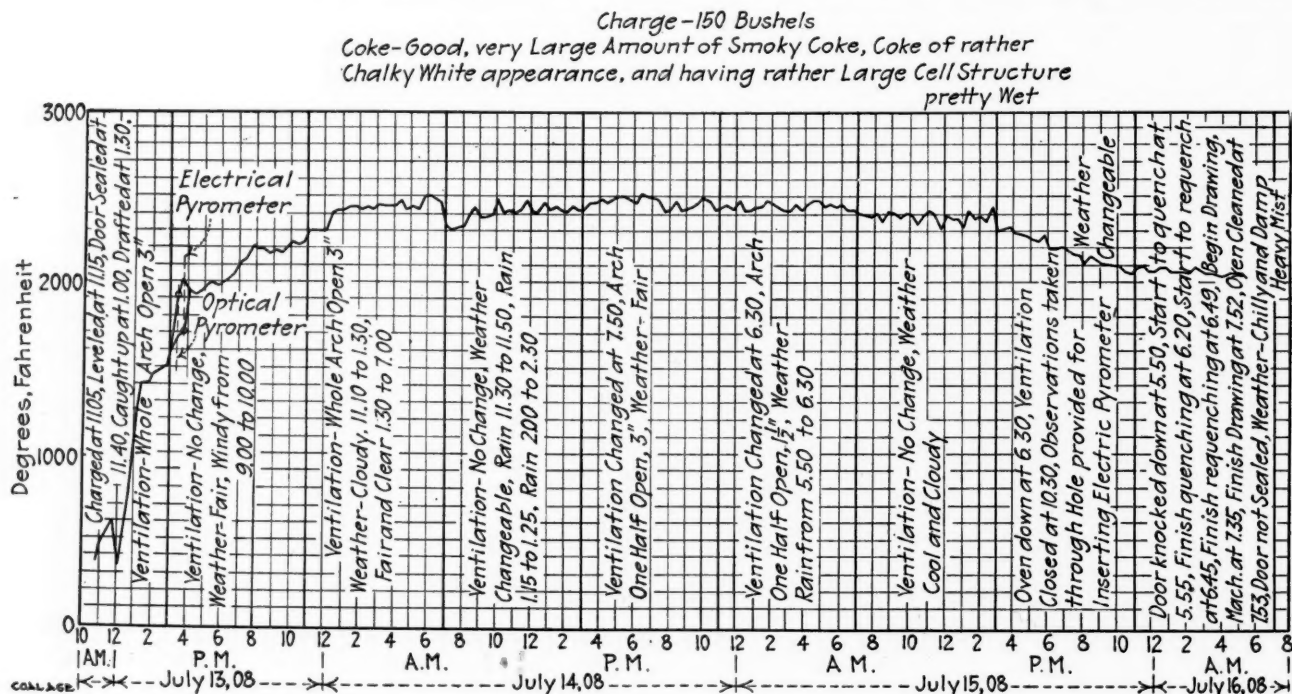
Coke otherwise perfect may be spoiled by watering it after it has been drawn from the oven. The man quenching the oven should make a careful distribution of the water over the incandescent coke, and the quenching should only go to the point of extinguishing the fire, when the pipe should be pulled from the oven. If the water is thrown on the coke for a longer period than this, saturation will follow with the consequent cooling of the oven.

If the fire in the coke is not put out with the first application of water, the coke should be requenched while

air must enter at the door of the oven to permit a brisk combustion until the active generation of gases has subsided. Following this the air space at the top of the door is to be gradually decreased until the flaming on the surface of the incandescent coke ceases. The oven door should then be tightly sealed with the lid placed on the trunnel head until the coke is quenched.

Failing to put the lid on the trunnel head, neglecting to repair chinks that occur between the jamb bricks, or not sealing the oven door thoroughly, result in the burning and consequent waste of fixed carbon.

Coke, which shows upon analysis a high per cent. of volatile matter, may also be the result of uneven leveling of the coal. The process of fusing and coking begins with the surface of the coal and continues downward through the mass to the bottom. If the charge of coal has been unevenly leveled, the vertical sections of the charge being of varying thicknesses, will not all burn off



inside the oven. If watered on the ground after being drawn from the oven, the moisture does not evaporate from the coke. An analysis of such coke may show the moisture varying from 2 to 5 per cent., or, perhaps, even more.

In the very nature of things, air is necessary in the beehive process to furnish the requisite heat for the coking of the coal by the combustion of the volatile matter. Air is, therefore, admitted through the door of the oven to supply the necessary oxygen to secure complete combustion of the gases thrown off by the coal while coking.

Experience has proved that the key to the ventilating problem is this: The supply of air entering the oven must be adjusted so as to give a complete combustion or as nearly so as is possible in practical work. Observation shows that the largest volumes of gas are liberated by the coal in the early stages of the process, varying with the amount of volatile matter in the coal. Enough

in the same length of time. Thus there will be patches in the oven, which will be underburned coke, with "black butts" and dark-colored masses running high in volatile matter.

A good grade of coke may be readily identified by the presence of silvery globules on the upper half of the section, which, when held in the sunlight, often have a tendency toward iridescence. The silvery globules are the deposits formed by the gases from the volatile hydrocarbons in the coal during their upward passage through the fissures of the incandescent mass which has been already coked.

A high per cent. of ash in coke may be caused by a poor interior condition of the oven. The intense heat sometimes breaks the silica brick in the crown of the oven, bits of brick and brick dust falling upon the coke. The very best grade of silica brick should always be used in oven crowns, as these will stand the amount of heat with which they are likely to come in contact.

## VARIATION IN COKE

The records of two differing conditions, under which the same coal was coked, follow, the marked contrast in the coke produced being shown in each case by the analyses.

## TEST No. 1

*Conditions:* Oven was not sealed and was allowed to stand over prior to charging. The bottom was not swept out. An hour elapsed before the coal ignited. There was insufficient ventilation at top of door in the beginning, which was not altered throughout the process. The charge was burned off long before door was sealed. The lid was not used at all. The coke was overquenched. Brick dust was present on the top of the coke. Black Butts occurred on the coke near the door jamb. The coke was too dark in color and the cell structure spongy.

## ANALYSIS

	Per cent.
Moisture .....	2.71
Volatile matter .....	3.91
Fixed carbon .....	78.62
Ash .....	14.76
	100.00

## TEST No. 2

*Conditions:* Oven was in good repair. Hot ovens were on both sides. The bottom of the oven was cleaned out. Oven was sealed, standing idle 2½ hours prior to charging. Oven dazzling hot. Leveling very even. Coal ignited 4 min. after charging. Whole arch of door given 3 in. draft in the beginning. Combustion decidedly more brisk than in test No. 1. Draft was diminished gradually until charge ceased flaming. Carefully quenched. No black butts. Color-metallic gray with luster. Coke bore silvery globular deposits on upper half of section.

## ANALYSIS

	Per cent.
Moisture .....	0.61
Volatile matter .....	1.92
Fixed carbon .....	85.17
Ash .....	12.30
	100.00

With the preceding data in mind, the following nine questions will give the investigator a clue to his beehive-oven trouble, if the cause lies in the operation of the oven:

1. Are the ovens sufficiently hot when charged?
2. Are proper steps taken to regain heat between charges?
3. Are charges of uniform size?
4. Are charges too large or too small for the length of time that the ovens burn?
5. Does the ventilator attend to his duties?
6. Is the proper amount of air admitted to the ovens?
7. Is the coke properly quenched?
8. Are the ovens in good repair?
9. Are the charges evenly leveled?

A few years ago one of the large West Virginia coke-producing companies made a thorough investigation of the conditions which tend to produce the best coke, the research including pyrometer readings on the temperatures of the ovens, readings being taken every half hour and the temperatures plotted to show the variations graphically.

From the accompanying figure, an idea can be had of the rise and fall in temperatures throughout the coking process. The electrical pyrometer was used until the heat became strong enough to effect the optical pyrometer. The readings were taken by three men, each working an eight-hour shift.

The maximum temperature in the curve shown is 2520 deg., while in some instances where ovens are hotter before charging they frequently reach 2800 degrees.

❖

❖

## Machinery for Beehive Coke Ovens

By E. C. RICKS\*

*SYNOPSIS*—The three coke-drawing machines at present on the market are briefly described and their principal advantages and shortcomings set forth. A few short paragraphs are also devoted to a successful leveling machine.

❖

The purpose of this article is not to enumerate the various machines (almost a score of them) which have been designed for drawing coke from beehive ovens, but to outline briefly the operation of the three types at present in everyday operation.

The Hebb machine is one of the "over-drawing" type, operated by electricity, and pulls the coke from the oven onto a chain and slat conveyor, which deposits it in railroad cars. The machine is a very heavy affair, but performs its work fairly well although it has attained comparatively no commercial success. This has been due partly to "squabbling" among the stockholders, but mainly on account of the cost of the machine, which is necessarily much greater than that of the other ma-

chines mentioned below, while it, seemingly, has no advantages worth mentioning, to offset the additional expenditure. To the best of the writer's knowledge, there are five of these machines in use today; one at Jones & Laughlin's plant in Pittsburgh, and four at the plants of the Thompson Connellsville Coke Co., at Republic, Penn.

The Stauff machine—At present, there is only one of these in operation, it being located at the plant of the Taylor Coal & Coke Co., near Uniontown, Penn., of which plant, the inventor, D. B. Stauff, is general superintendent. This is also of the "over-drawing" type, similar to the Hebb machine. The conveyor part of this apparatus works on the same principle as the Hebb and Covington machines and is operated by electricity; however, air is used on the extractor part, not only to draw the coke, but to propel the device along the track in front of the ovens.

The Stauff machine, while yet in its infancy, is doing good work and attracting some attention. As to how well this machine will continue to stand up to everyday work, drawing its capacity of ovens, remains to be

\*Uniontown, Penn.



seen; however, the machine at Taylor works has been drawing 46 ovens per working day, for the past several months. The supreme test of time and operation under varied conditions, through which this machine will have to pass, before it can be considered a commercial success will be watched closely, and with interest by all coke operators.

#### THE PIONEER MACHINE HAS ATTAINED SUCCESS

The Covington was the pioneer machine to attain commercial success and is, today, the only one for drawing and loading coke from bee-hive ovens, which has been extensively adopted, there being approximately two hundred of them in operation throughout various sections of the United States and Canada, representing an investment of more than a million dollars.

From the crude machine operated by steam, shown in Fig. 1, the Covington has had its ups and downs, working under all imaginable conditions; being redesigned

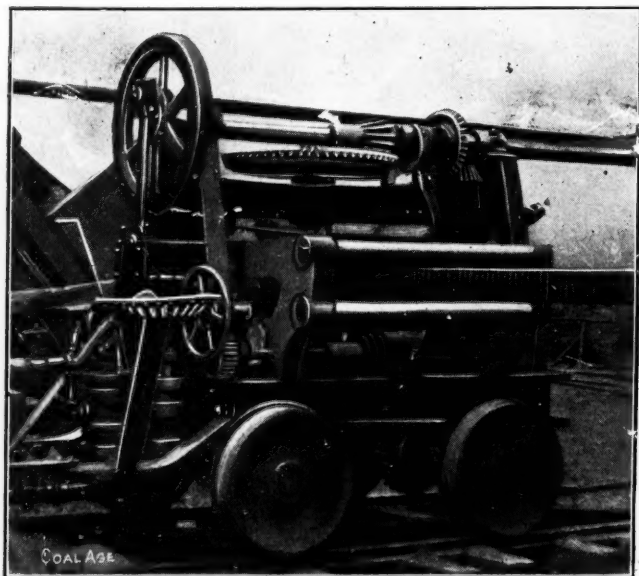


FIG. 1. THE FIRST SUCCESSFUL COVINGTON COKE-DRAWING MACHINE

from time to time, better material being used in its construction, whenever experience proved a change necessary for its betterment. So well have coke operators taken to this machine, that it has been necessary for the makers to build large additions to their plant twice within the past few years. Now they have a capacity of one coke machine every two days.

The Covington Machine Co., of Covington, Va., are the manufacturers of the Covington machine. This company reports that its entire output has been sold from three to four months ahead, for the past year. Although there are about fifty concerns using these machines, one of the best evidences of their utility is the fact that the H. C. Frick Coke Co. has given repeat orders five or six times. At present their total investment in these machines is close to a half-million of dollars.

The Covington machines are of the "under-drawing" type and are operated by electricity; every mechanical movement of the latest model being power driven.

The capacity of all three makes of machines above mentioned is from four to six ovens per hour. The coke being drawn, screened and loaded into cars, includ-

ing shifting of the machine, etc., within the period mentioned.

The total labor cost for drawing an oven in the Connellsville region, where most of these machines are in use, is 31c. per oven as against \$1.10 to \$1.15 per oven, for the same work done by hand. Adding to the labor cost, repairs to machine and ovens, power, oil, waste, interest on investment, etc., the machines effect a net saving of from 50 to 60c. per oven drawn, to say nothing of the increased production from the ovens, due to the short time required for drawing by machinery, allowing a longer burning period, which permits heavier charges of coal.

Fig. 2 shows one of the later model Covington drawers, a number of which have been installed in Pennsylvania and West Virginia, within the past four months. Twenty more of these machines are now on order for the same section, and will be installed within the next 60 to 90 days.

#### THE COVINGTON LEVELER

In Fig. 2 is also shown a Covington leveler, a number of which are in operation in the Connellsville region.

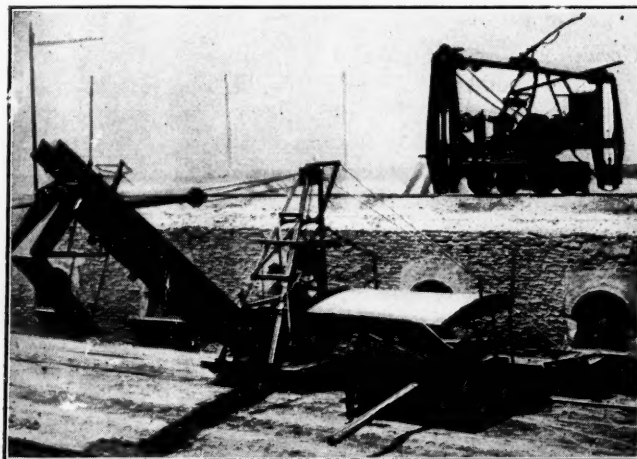


FIG. 2. A MODERN MACHINE, ALSO A LEVELER ON LARRY TRACK

The machine shown in the picture was put in service at the Continental No. 1 works, of the H. C. Frick Coke Co., Uniontown, Penn., June 4, 1909, and so far has leveled more than 150,000 ovens. At this plant there are 400 ovens, comprising two blocks and one bank, and this one leveling machine takes care of the entire installation, keeping ahead of three larries charging. The machine levels from 30 to 40 ovens per hour, including shifting, and requires only one man for its operation.

Where this leveling machine is used, as soon as the coke is drawn, the door is immediately bricked completely, and daubed, regardless of when the oven is to be re-charged. This, of course, conserves heat and makes the new charge ignite much sooner than is the case where it is necessary to leave the door partly open until the leveling is done by hand.

This machine, also, makes it possible to burn heavier charges, besides, being a great labor-saver. It has been conservatively estimated that 5 per cent. additional coal can be coked, in a given time, where the machine is used, owing to the conservation of heat, above mentioned, and the good leveling done.

## EDITORIALS

### Evolution in Coking Practice

Coke manufacturers have been slow to give up the old beehive type of oven. There has probably never been an example of more tenacious adhering to acknowledged uneconomical methods than is exemplified in this case. That a change must eventually take place is obvious, but it is equally clear that it will not be an abrupt change such as is frequently witnessed in metallurgical engineering. In this latter profession, when new and more effective methods of ore treatment are devised, the engineers are prompt to take advantage of them and there are innumerable examples of elaborate and expensive plants being dismantled before they were scarcely in operation.

The evolution of the beehive oven, while less rapid, and along more conservative lines is, however, none the less sure. Thus we find that a radical modification of it is now being generally accepted in the Connellsville region, the Mitchell type of rectangular oven having definitely superseded it there. It is estimated that less than two per cent. of the ovens constructed in that district during the last year have been of the beehive type. In its present accepted form the Mitchell is not a byproduct oven, but the inventors have devised certain alterations by which they expect to be able to effect a saving of these, and without any depreciation in the quality of the product.

The principal advantage of the Mitchell oven lies in the rapidity with which it can be discharged. To "pull" the old beehive type requires from  $3\frac{1}{2}$  to 4 hr., while the mechanical pusher and loader used with the Mitchell oven reduces this time to as many minutes. By the former method the oven becomes cooled to such an extent during the time the coke is being extracted that there is also a loss of about two hours more before the coal starts burning properly, so that the total time lost amounts to between  $5\frac{1}{2}$  and 6 hr. In addition to this the charging capacity of the Mitchell type is between 8 and 9 tons per oven, or from 35 to 50 per cent. greater than the standard Connellsville beehive oven.

✱

### Mother Jones

Mother Jones came to New York and addressed a meeting of 1500 enthusiasts and left the following morning for Washington. The yellow journals gave her three inches of insignificant type with a one-column headline. So despite the cheering and waving of banners, Mother Jones did not score any marked triumph.

She had been brought to the city for the purpose of setting a new monthly periodical on its feet and perhaps she was successful in this endeavor, but she did not bring the sober elements of society to a decision favoring her cause, for her supporters on the platform were Socialists and Industrial Workers of the World, and in Carnegie Hall were few if any labor unionists and none of the phil-

anthropic multitude who frequently make labor troubles their hobby.

Mrs. Jones is a venerable old woman, 81 years of age. For the most part, one is disposed to believe she does not purposely palter with the truth. Perhaps she knew well the temper of her audience, knew that it was not ill-disposed toward violence, for she did not hesitate to admit that the large following she took to Charleston to demand the dismissal of the guards provided themselves with guns before their return to their homes.

She detailed the evidence against her at the court martial and related that a mine superintendent and a bookkeeper complained that she had incited them to violence by calling them individually, and we may add not very brilliantly, "two by fours." A major in uniform complained that he had been incited by being told that, one of these days, his epaulets would be removed and swords would be transformed into pruning hooks.

These are mild ways of creating a disturbance, but Mother Jones showed that she is not a child at the art, and has not served her apprenticeship for nothing, for at the hall she declared that Morgan's fingers had dripped with the blood of women and children and that a certain senator had murdered 700 men in his mine by an explosion. We could not help wondering whether Mother Jones had not uttered in the hill country of West Virginia, language at least as inciting as she used in Carnegie Hall.

She had nothing to say about wages or company-store prices. It is true that she did open her discourse by saying that the Cabin Creek miners had never had a good meal and that their toes protruded from their worn-out shoes. But she made it clear that the fight was primarily for the establishment of a union in some places and for its effectual recognition in others.

We are not sure that unions can ever greatly benefit the working classes but nevertheless we cannot feel that the operator does well to attempt in any way to prevent their formation, unreasonably harassing though they often are. Interference with the liberty of the individual does but exasperate him and breed violence such as West Virginia has just seen and will see again shortly if the signs do not fail.

The Industrial Workers of the World think they note in West Virginia a fit place for their lawless attacks on society and though now they are cumbered with the barbers' strike, and the frenzied attempt to wipe Paterson, N. J., from the map, they may at any time descend on the coal fields of West Virginia.

They frankly confess that they have no ultimate program. The present evil to be overborne, they declare, is capitalism; that being overthrown, the work of reconstruction will be commenced. But the manner of structure to be selected, they do not know. They in very truth "don't know where they are going but they're on their way."

The impression is abroad that the Industrial Workers of the World are the very off-scouring of the people.

Those who have such an idea would be disabused by a visit to their well attended meetings. They are fanatics of the type of the English suffragettes. The frenzy of modern life is in their veins, a wild craving for excitement, to leave the beaten path, to plunge headlong with their fellows, whether friendly or resisting. This spirit of unrest has seized all the overstrung, brilliant and weak-willed alike, and among their leaders are many men of ability and character.

The only way to meet the evil propaganda which have created them is by mending what is now unjust and by commencing a campaign of education which will sweep away the tissue of lies that magazines and newspapers prepare for the pleasure of their subscribers. What object can there be to a publisher to tell the truth when the sale of a newspaper depends on the number of readers? Most of these are not wealthy and the journalist must condemn the "haves" and commiserate the "have-nots," right or wrong.

If every government bureau must publish bulletins, engage press agents, and send trained speakers, north, south, east and west, how are the coal operators going to succeed if they sit passively through it all and do not defend their positions? The world is very equal, very human; the high places and the low are filled with men, good and evil. They who would maintain those economic principles which they believe will promote human happiness, must urge them at some expense of time and money on their less enlightened fellows and give the world a glimpse, we think it will be a gladdening glimpse, of the real brotherhood and true socialism of our modern coal operators.

❖

### Coal Storage under Water

Some of the larger industrial companies, as well as many of the railroads, habitually store coal in the open air upon vacant property. This method is, however, open to two serious objections. Soft coal, when subjected to the action of the atmosphere, is certain to oxidize to a greater or less extent, and thus depreciate in heat value. Furthermore, the action of frost tends to disintegrate the individual pieces of coal, thus increasing the losses in burning. Second, particularly if the coal contains a large percentage of sulphur and is stored to considerable depth, there exists a strong liability to spontaneous combustion, and considerable losses occur annually from this cause.

To overcome both of these difficulties, coal is sometimes stored under water in concrete tanks or vats of considerable size and capacity. It is claimed by those who employ this method of storage that the practically negligible loss in heat qualities vastly more than offsets the increased amount of moisture in the coal as it goes to the boiler furnaces. Furthermore, the subaqueous storage of the fuel renders spontaneous combustion impossible, and there is therefore no danger of loss from this source. This result, too, is accomplished regardless of the size or quality of the coal stored.

A large Chicago manufacturing firm is at present employing this method at one of its suburban plants, with results which are averred to be entirely satisfactory. The fuel handled is No. 1 screenings, Illinois coal, which ranges in size from dust up to approximately 1¼-in. lumps. This fuel, after being loaded out from storage,

is allowed to drain for a few hours before passing to the chain-grate stokers with which the boiler furnaces are fed.

Although the expense of building a storage plant of this kind is great, it would appear that in many instances at least the advantages gained, namely, small loss from oxidation, immunity from spontaneous ignition, and the fact that the smallest sizes and poorest grades of coal may be thus safely stored throughout indefinite periods, are commensurate with the expense. The cost of handling coal in a storage scheme of this kind should not be higher and may be decidedly less than when it is piled upon the ground in the usual manner.

❖

### John Fulton

A number such as this would be incomplete did it not reflect some opinions and views of the leading spirits in the coke industry. Fulton and coke are two such entirely synonymous words that each immediately recalls the other. John Fulton occupied a unique position in the coke industry of the past—a position which no one may ever attain to in the history to come. He stood preëminently at the head of the profession in all its ramifications, whether of the beehive oven, the retort oven or any of the intricate regenerative or byproduct recovery processes. As he now frankly concedes, the industry has become too complicated for one brain to grasp in its entirety; in common with other engineering professions, new branches and subdivisions have developed, each requiring the attention of a specialist so that it is quite probable no one man will ever again predominate the profession as John Fulton has in the past.

Mr. Fulton thinks the country is facing a great problem when the Connellsville region is exhausted. The life of these fields is quite definitely defined now, and when the end comes, the retort oven must be resorted to. This he thinks will also witness the final demise of the beehive oven. But so long as there is a supply of these coals, he predicts that the old-fashioned beehive will continue to thrive, as no retort oven has yet been devised that will displace them with the world's two standard coking coals—the Connellsville and the Durham, England. And it is incidentally interesting to note that Mr. Fulton puts the Connellsville product ahead of Great Britain's, the slightly higher ash content of the former producing somewhat better slag in the blast furnace.

Conservation is also a favorite topic with Mr. Fulton. While both coal and iron are being exhausted at an alarming rate, he thinks that the real conservation will be effected by greater economies in the methods of using, particularly in the case of coal. He also views the growing scarcity of water with some alarm.

Of the foreign coal-mining methods, Mr. Fulton has the greatest disdain. He spoke of one German installation he visited which was constructed along the most elaborate and permanent lines. Steel and concrete were used throughout and the whole represented an almost awe-inspiring edifice. The cages had many compartments for cars, but these were only of a quarter-ton capacity, while the production of the plant was only between 200 and 300 tons per day. The local superintendent also explained that they were most careful to ship only sufficient coal to just meet the market requirements. Evidently a Sherman anti-trust law is unknown in Germany.



## A Model Coal-Preparation Plant

BY MILTON J. WILLIAMS\*

During the past few years, although much has been written about the subject of coal mining and coke manufacture in both beehive and byproduct ovens, only a comparatively meager amount has appeared concerning the pulverization or other preparation which the coal should receive if a fine grained and superior grade of coke is to be anticipated.

In this matter of preparation before coking, the plant of the Byproduct Coke Corporation at Solvay, Ill., just south of South Chicago, may be well considered as an example of the best practice in this country. Unfortunately, it is impossible to show photographs illustrating the various machines and processes.

The preparation plant consists of three distinct sets of units, each consisting of a Bradford breaker, a coal hopper, a magnetic separator and feeding belt, and a No. 6 Williams crusher. The coal handled is smokeless and Boomer West Virginia bituminous. It is first passed through a Bradford breaker provided with perforations  $1\frac{1}{2}$  in. square. Here a large percentage of the foreign matter is removed and no coal passes on until it has been reduced to the size of the perforations above mentioned.

Of this  $1\frac{1}{2}$ -in. product and smaller, 80 to 85 per cent. is  $\frac{1}{2}$  in. and under. When the moisture content of the coal reaches  $3\frac{1}{2}$  to 5 per cent., the material becomes difficult to handle in hoppers and chutes, as it is an inert or slow-moving body; consequently, special chutes are employed to handle this coal.

### THE BRADFORD BREAKERS

The Bradford breakers above mentioned are of Heyl and Patterson design and are regulation size. Each has a capacity of 125 to 150 tons per hour, and the succeeding machinery over or through which the coal travels is arranged for a similar capacity. From the breakers the material falls into large steel bins or hoppers, from whence it passes to magnetic separators in the form of short belt conveyors. These are approximately 5 ft. wide, and 8 or 10 ft. long.

The coal upon these belts varies from 3 to  $3\frac{1}{2}$  in. deep throughout the full width of the conveyor. The head or driving pulley is magnetized and consequently catches and discharges into a special chute a considerable percentage of the iron or foreign metallic material which has found its way from one source or other into the coal. These separators also furnish an automatic, uniform feed to the crushers.

From these belts the coal passes directly to No. 6 Williams Jumbo crushers and is pulverized or ground to a product ranging from 80 to 90 per cent. through a  $\frac{1}{8}$ -in. opening. These machines are direct connected to 150-hp. alternating-current motors by means of a Muir friction clutch. Such clutches are employed to pick up the load gradually in starting the crushers as the hammer type of pulverizer requires more power to start than to operate empty at full speed. In many similar installations flexible couplings are used to direct-connect crushers to motors, but in such cases it is advisable to have special motors with high starting torque.

These particular crushers are 48 in. in diameter and

36 in. wide. They weigh approximately 25,000 lb. each, and operate at 750 r.p.m. Their durability, accessibility, and efficiency are too well known to require further comment.

After being crushed and pulverized, the coal is carried by an inclined belt conveyor to a storage bin, from which it may be drawn off from time to time and carried to the ovens as the operation of the latter may require.

From the foregoing it will be seen that the preparation of the coal for coking at this plant is continuous and entirely mechanical, and can therefore be accomplished with a minimum of labor and superintendence. A failure or breakdown of any one piece of the apparatus can only decrease the output of the preparation plant by one-third, for should the failure of the particular unit be sufficiently serious to stop operations in that part of the equipment, there are, as mentioned above, three separate and distinct routes by which the coal travels from the original dumping or storage point to the bins serving the coke ovens.

✱

## A New Method of Boiler Cleaning

A new type of boiler-tube cleaner, or, more strictly speaking, a new method of boiler-scale removal, has been recently invented and placed upon the market in England



THE OXYACETYLENE SCALE-REMOVING APPARATUS  
AFTER A TRIAL TEST

by Adolph Schror. This method is radically different from those common in this country, which are strictly mechanical in their action.

The principle of the new apparatus is simple. It consists in the employment of an oxyacetylene flame of high temperature but of moderate pressure, which is rapidly played upon the scale. The effect is to disintegrate and break down the deposits, and, notwithstanding the high temperature of the flame, the makers claim that there is no cause for anxiety on the score of undue heating in the boiler tubes, and that the apparatus may be used to remove the thinnest scale.

Contracts under this system are undertaken on the "no cure, no pay" principle, by the Pyro Boiler Cleaning Co., of London, and we understand that thus far, at least, the results obtained have been entirely satisfactory.

\*Old Colony Building, Chicago, Ill.

# Coke Works of the Entire Connellsville Region

Revised and Corrected to Apr. 1, 1913. Published through Courtesy of "Connellsville Courier."

## CONNELLSVILLE REGION

No.	Name of Works	Names of Operators	Postoffice	Nearest Railroad Station
Ovens				
200	Acme	W. J. Rainey	New York, N. Y.	Mt. Pleasant, P. R. R.
80	Acme	Penn Coke Co.	Uniontown, Pa.	Smithfield, B. & O.
300	Adelaide	H. C. Frick Coke Co.	Pittsburgh, Pa.	Adelaide, P. & L. E.
356	Alverton	H. C. Frick Coke Co.	Pittsburgh, Pa.	Alverton, P. R. R.
397	Baggaley	H. C. Frick Coke Co.	Pittsburgh, Pa.	Baggaley, P. R. R.
182	Beatty	Mt. Pleasant Coke Co.	Greensburg, Pa.	Beatty, P. R. R.
50	Bethany	Majestic Coke Co.	Uniontown, Pa.	Ruffsedale, P. R. R.
300	Bitner	H. C. Frick Coke Co.	Pittsburgh, Pa.	Bitner, B. & O.-P. R. R.
120	Boyer	Mt. Pleasant Coke Co.	Greensburg, Pa.	Udell, P. R. R.
240	Brinkerton	H. C. Frick Coke Co.	Pittsburgh, Pa.	Brinkerton, P. R. R.
299	Buckeye	H. C. Frick Coke Co.	Pittsburgh, Pa.	Star, P. R. R.-Mullen, B. & O.
30	Brush Run	Brush Run Coal & Coke Co.	Mt. Pleasant, Pa.	Mt. Pleasant, P. R. R.-B. & O.
260	Calumet	H. C. Frick Coke Co.	Pittsburgh, Pa.	Calumet, P. R. R.
32	Carolyn	Peerless-Connellsville Coke Co.	Uniontown, Pa.	Alverton, P. R. R.
303	Central	H. C. Frick Coke Co.	Pittsburgh, Pa.	Tarr, P. R. R.
54	Chester	Sunshine Coal & Coke Co.	Uniontown, Pa.	Vance Mills, P. V. & C.
150	Clare	Clare Coke Co.	Greensburg, Pa.	Trauger, P. R. R.
120	Coalbrook	H. C. Frick Coke Co.	Pittsburgh, Pa.	Ruth, P. R. R.
400	Collier	H. C. Frick Coke Co.	Pittsburgh, Pa.	Collier, B. & O.
400	Continental No. 1	H. C. Frick Coke Co.	Pittsburgh, Pa.	Uniontown, P. R. R.-B. & O.
326	Continental No. 2	H. C. Frick Coke Co.	Pittsburgh, Pa.	Walnut Hill, P. R. R.
306	Continental No. 3	H. C. Frick Coke Co.	Pittsburgh, Pa.	Newcomer, P. R. R.
120	Crossland	H. C. Frick Coke Co.	Pittsburgh, Pa.	Crossland, B. & O.
333	Davidson	H. C. Frick Coke Co.	Pittsburgh, Pa.	Davidson, P. R. R.-Connellsville, B. & O.
40	Dexter	Connellsville Coke Co.	Connellsville, Pa.	West Overton, B. & O.
230	Dorothy	H. C. Frick Coke Co.	Pittsburgh, Pa.	Latrobe, P. R. R.
40	Ellen No. 1	Whyel Coke Co.	Uniontown, Pa.	Whitney, P. R. R.
50	Ellen No. 2	Whyel Coke Co.	Uniontown, Pa.	Whitney, P. R. R.
100	Elizabeth	Unity-Connellsville Coke Co.	Greensburg, Pa.	Dorothy, P. R. R.
218	Elm Grove	W. J. Rainey	New York, N. Y.	Elm Siding, B. & O.
135	Fort Hill	W. J. Rainey	New York, N. Y.	Lickerson Run, P. & L. E.
101	Gilmore	Gilmore Coke Co.	Uniontown, Pa.	Smithfield, B. & O.
124	Grace	W. J. Rainey	New York, N. Y.	Moyer, P. R. R.
272	Hecla No. 1	H. C. Frick Coke Co.	Pittsburgh, Pa.	Hecla, P. R. R.
300	Hecla No. 2	H. C. Frick Coke Co.	Pittsburgh, Pa.	Trauger, P. R. R.
300	Hecla No. 3	H. C. Frick Coke Co.	Pittsburgh, Pa.	Hecla, P. R. R.
120	Henry Clay	H. C. Frick Coke Co.	Pittsburgh, Pa.	Broad Ford, B. & O.
355	Hostetter	Hostetter-Connellsville Coke Co.	Pittsburgh, Pa.	Hostetter, P. R. R.
100	Humphreys	Bessemer Coke Co.	Pittsburgh, Pa.	Trauger, P. R. R.
250	Juniata	H. C. Frick Coke Co.	Pittsburgh, Pa.	Juniata, B. & O.
20	Junction	Marietta-Ganier Coke Co.	Connellsville, Pa.	Dickerson Run, P. & L. E.
306	Kyle	H. C. Frick Coke Co.	Pittsburgh, Pa.	Fairchance, P. R. R.-B. & O.
499	Leisenring No. 1	H. C. Frick Coke Co.	Pittsburgh, Pa.	Leisenring, P. R. R.-B. & O.
496	Leisenring No. 2	H. C. Frick Coke Co.	Pittsburgh, Pa.	Bute, P. R. R.
502	Leisenring No. 3	H. C. Frick Coke Co.	Pittsburgh, Pa.	Monarch, P. R. R.
304	Leith	H. C. Frick Coke Co.	Pittsburgh, Pa.	Leith, P. R. R.-B. & O.
227	Lemont No. 1	H. C. Frick Coke Co.	Pittsburgh, Pa.	Darent, P. R. R.-Lemont, B. & O.
350	Lemont No. 2	H. C. Frick Coke Co.	Pittsburgh, Pa.	Lemont, B. & O.
20	Little Sunshine	King Coke Co.	Uniontown, Pa.	Humphries, P. R. R.
32	Love	C'ville Mutual Coal & Coke Co.	Scottsdale, Pa.	Mutual, P. R. R.
40	Magee	Magee Coke Co.	Uniontown, Pa.	Clare, P. R. R.
60	Mahoning	Mahoning Coal & Coke Co.	Connellsville, Pa.	Dunbar, P. R. R.
510	Mammoth	H. C. Frick Coke Co.	Pittsburgh, Pa.	Mammoth, P. R. R.
400	Marguerite	H. C. Frick Coke Co.	Pittsburgh, Pa.	Marguerite, P. R. R.
25	Marion	Marion Coke Co.	Udell, Pa.	Udell, P. R. R.
165	Morgan	H. C. Frick Coke Co.	Pittsburgh, Pa.	Morgan, B. & O.
360	Mt. Braddock	W. J. Rainey	New York, N. Y.	Mt. Braddock, B. & O.-Gist, P. R. R.
310	Mt. Pleasant	Mt. Pleasant Coke Co.	Greensburg, Pa.	Hecla, P. R. R.
195	Mutual	H. C. Frick Coke Co.	Pittsburgh, Pa.	Mutual, P. R. R.
32	Myers	Brownfield-C'ville Coke Co.	Uniontown, Pa.	Tarr, P. R. R.
329	Nellie	Brown & Cochran	Dawson, Pa.	Dickerson Run, P. & L. E.
252	Oliphant	H. C. Frick Coke Co.	Pittsburgh, Pa.	Oliphant Furnace, P. R. R.
328	Oliver No. 1	Oliver & Snyder Steel Co.	Pittsburgh, Pa.	Redstone Jet, P. R. R.-Oliver, B. & O.
480	Oliver No. 2	Oliver & Snyder Steel Co.	Pittsburgh, Pa.	Redstone Jet, P. R. R.-Oliver, B. & O.
300	Oliver No. 3	Oliver & Snyder Steel Co.	Pittsburgh, Pa.	Thaw Station, P. V. & C.
221	Painter	H. C. Frick Coke Co.	Pittsburgh, Pa.	McClure, B. & O.
200	Paul	W. J. Rainey	New York, N. Y.	Dickerson Run, P. & L. E.
25	Pennsville	Pennsville Coke Co.	Pennsville, Pa.	Pennsville, P. R. R.
15	Percy	Marietta & Stillwagon	Connellsville, Pa.	Percy, B. & O.
400	Phillips	H. C. Frick Coke Co.	Pittsburgh, Pa.	Phillips Mine, P. R. R.
95	Rainey	W. J. Rainey	New York, N. Y.	Dawson, B. & O.
446	Redstone	H. C. Frick Coke Co.	Pittsburgh, Pa.	Brownfield, P. R. R.-B. & O.
550	Revere	W. J. Rainey	New York, N. Y.	Revere Works, P. R. R.
26	Sapper	Sapper Coke Co.	Uniontown, Pa.	Leckrone, B. & O.-M. R. R.
110	Semet-Solvay	Semet-Solvay Co.	Dunbar, Pa.	Dunbar, P. R. R.-B. & O.
42	Shannon	Shannon Coal & Coke Co.	Uniontown, Pa.	Jimtown, B. & O.
36	Shirley	South Fayette Coke Co.	Uniontown, Pa.	Baggaley, P. R. R.
448	Shoaf	H. C. Frick Coke Co.	Pittsburgh, Pa.	Shoaf, B. & O.
625	Southwest No. 1	H. C. Frick Coke Co.	Pittsburgh, Pa.	Morewood, P. R. R.
220	Southwest No. 2	H. C. Frick Coke Co.	Pittsburgh, Pa.	Alice Mines, P. R. R.
205	Southwest No. 3	H. C. Frick Coke Co.	Pittsburgh, Pa.	Tarr, P. R. R.
61	Spring Grove	Cochran Bros.	Dawson, Pa.	Dawson, B. & O.
903	Standard	H. C. Frick Coke Co.	Pittsburgh, Pa.	Mt. Pleasant, P. R. R.-B. & O.
155	Stewart	Stewart Iron Co., Lim.	Uniontown, Pa.	Uniontown, P. R. R.-B. & O.
135	Summit	H. C. Frick Coke Co.	Pittsburgh, Pa.	Summit, B. & O.; Summit Ter. P. & L. E.
40	Thomas	Whyel Coke Co.	Uniontown, Pa.	Smiley, B. & O.
464	Trotter	H. C. Frick Coke Co.	Pittsburgh, Pa.	Trotter, P. R. R.-B. & O.
50	Union	W. J. Rainey	New York, N. Y.	Alverton, P. R. R.
350	United	H. C. Frick Coke Co.	Pittsburgh, Pa.	United, P. R. R.
245	Valley	H. C. Frick Coke Co.	Pittsburgh, Pa.	Valley Wks. P. R. R. Valley Mines, B. & O.
80	Veteran	Mt. Pleasant Coke Co.	Greensburg, Pa.	Udell, P. R. R.
150	White	H. C. Frick Coke Co.	Pittsburgh, Pa.	Sherrick, B. & O.
352	Whitney	Hostetter-Connellsville Coke Co.	Pittsburgh, Pa.	Whitney, P. R. R.
300	Wynn	H. C. Frick Coke Co.	Pittsburgh, Pa.	Wynn Works, P. R. R.
500	Yorkrun	H. C. Frick Coke Co.	Pittsburgh, Pa.	Yorkrun, M. R. R.-B. & O.
241	Youngstown	H. C. Frick Coke Co.	Pittsburgh, Pa.	Stambaugh, B. & O.-P. R. R.

22,319

## LOWER CONNELLSVILLE REGION

40	Adah	Adah Coke Company	Uniontown, Pa.	Cheat Haven, B. & O.
400	Alicia	W. Harry Brown	Alicia, Pa.	South Brownsville, M. R. R.
200	Allison No. 1	W. J. Rainey	New York, N. Y.	Allison, M. R. R.
40	Anica	Wilkey & Feather Coke Co.	Uniontown, Pa.	Whitsett Junction, P. & L. E.
138	Atcheson	Republic Iron & Steel Co.	Youngstown, O.	Gans, B. & O.
20	Baxter Ridge	Baxter Ridge Coal & Coke Co.	Uniontown, Pa.	Outcrop, B. & O.
100	Bridgeport	H. C. Frick Coke Co.	Pittsburgh, Pa.	South Brownsville, M. R. R.
470	Brier Hill	Brier Hill Coke Co.	Brier Hill, Pa.	Brier Hill, M. R. R.
20	Browning	Browning Coke Co.	Uniontown, Pa.	Vance Mill Jet, P. R. R.
50	Brownsville	Brownsville Coke Co.	Uniontown, Pa.	Brownsville, P. R. R.-P. & L. E.-M. P. R.

## LOWER CONNELLSVILLE REGION (Continued)

No. Ovens	Name of Works	Names of Operators	Postoffice	Nearest Railroad Station
426	Buffington	H. C. Frick Coke Co.	Pittsburgh, Pa.	New Salem, M. R. R.
34	Burchinal	Smithfield Coal & Coke Co.	Smithfield, Pa.	Smithfield, B. & O.
205	Century	Century Coke Co.	Brownsville, Pa.	Brownsville, M. R. R.
40	Champion	Champion Connellsville Coke Co.	Brownsville, Pa.	Brownsville, P. R. R.-M. R. R.-P. & L. E.
24	Coffman	South Fayette Coke Co.	Uniontown, Pa.	New Salem, M. R. R.
500	Colonial No. 1	H. C. Frick Coke Co.	Pittsburgh, Pa.	Smock, P. V. & C.
156	Colonial No. 3	H. C. Frick Coke Co.	Pittsburgh, Pa.	Grindstone, P. V. & C.
300	Colonial No. 4	H. C. Frick Coke Co.	Pittsburgh, Pa.	Grindstone, P. V. & C.
142	Cyrrila	Sunshine Coal & Coke Co.	Uniontown, Pa.	Linn, P. V. & C.
120	Crystal	United Connellsville Coke Co.	Pittsburgh, Pa.	Gans, B. & O.
250	Dearth	H. C. Frick Coke Co.	Pittsburgh, Pa.	Low Phos, M. R. R.
402	Donald Nos. 1 and 2	Consolidated C'ville Coke Co.	Uniontown, Pa.	Grays Landing, M. R. R.
160	Donald No. 3	Consolidated C'ville Coke Co.	Uniontown, Pa.	Grays Landing, M. R. R.
50	Dunn	The Bixler Coal & Coke Co.	Pittsburgh, Pa.	Edna, B. & O.
500	Edenborn	H. C. Frick Coke Co.	Pittsburgh, Pa.	Edenborn, M. R. R.
149	Edna	Waltersburg Coke Co.	Uniontown, Pa.	Waltersburg, P. R. R.
32	Emery	South Fayette Coke Co.	Uniontown, Pa.	Leckrone, B. & O.-M. R. R.
132	Eleanor	Sunshine Coal & Coke Co.	Uniontown, Pa.	Low Phos, M. R. R.
200	Fairbank	Struthers Coal & Coke Co.	Cleveland, O.	Fairbanks, M. R. R.
32	Finley	Jas. Byrne & Co.	Uniontown, Pa.	New Salem, M. R. R.
400	Footedale	H. C. Frick Coke Co.	Pittsburgh, Pa.	Footedale, M. R. R.
220	Francis No. 1	Sunshine Coal & Coke Co.	Uniontown, Pa.	Martin, M. R. R.
50	Francis No. 2	Sunshine Coal & Coke Co.	Uniontown, Pa.	Newcomer, P. R. R.
80	Fretts	South Fayette Coke Co.	Uniontown, Pa.	Messmore, P. R. R.
119	Garwood	Etna-C'ville Coke Co.	Connellsville, Pa.	Simpson, M. R. R.
58	Genuine	Genuine Connellsville Coke Co.	Waltersburg, Pa.	Waltersburg, P. R. R.
400	Griffin Nos. 1 and 2	Bessemer Coke Co.	Pittsburgh, Pa.	Masontown, M. R. R.
52	Hill Top	Sunshine Coal & Coke Co.	Uniontown, Pa.	Newcomer, P. R. R.
210	Herbert	Connellsville Central Coke Co.	Pittsburgh, Pa.	Low Phos, M. R. R.
38	Hope	Hope Coke Co.	Uniontown, Pa.	Shoaf, B. & O.
74	Hoover	James H. Hoover	M'Clellandt'wn, Pa.	Ache Junction, M. R. R.-P. R. R.
100	Hustead	Hustead-Semans Coal & C. Co.	Uniontown, Pa.	East Millsboro, M. R. R.
260	Isabella No. 1	Isabella-Connellsville Coke Co.	Pittsburgh, Pa.	Isabella Sta. M. R. R.
140	Katherine	Union-Connellsville Coke Co.	Uniontown, Pa.	Simpson, M. R. R.
200	LaBelle	LaBelle Coke Co.	LaBelle, Pa.	LaBelle, M. R. R.
220	Lafayette	Atlas Coke Co.	Helen, Pa.	Helen, P. R. R.
462	Lambert	H. C. Frick Coke Co.	Pittsburgh, Pa.	Lambert, M. R. R.
516	Leckrone	H. C. Frick Coke Co.	Pittsburgh, Pa.	Leckrone, B. & O.-M. R. R.
30	Leon	Franklin Coke Co.	Uniontown, Pa.	Tippecanoe, P. R. R.
400	Lincoln	Lincoln Coal & Coke Co.	Scottdale, Pa.	Waltersburg, P. R. R.
250	Low Phos	Connellsville Central Coke Co.	Pittsburgh, Pa.	Low Phos, M. R. R.
45	Madison	United Connellsville Coke Co.	Pittsburgh, Pa.	Madison, P. R. R.
64	Marion	Southern Connellsville Coke Co.	Uniontown, Pa.	Cheat Haven, B. & O.
244	Martin	Republic Iron & Steel Co.	Youngstown, O.	Martin, M. R. R.
202	McKeefrey	McKeefrey Coal Co.	Leetonia, Ohio	Martin, M. R. R.
257	Millsboro	Bessemer Coke Co.	Pittsburgh, Pa.	Besco, P. R. R.
150	Mt. Hope	Mt. Hope Coke Co.	Uniontown, Pa.	Linn, P. V. & C.
60	Murphy	Echard Coal & Coke Co.	Connellsville, Pa.	Star Junction, P. & L. E.
30	Newcomer	Newcomer Coke Co.	Uniontown, Pa.	Newcomer, P. R. R.
100	Old Home	W. J. Parshall	Uniontown, Pa.	Parshall, M. R. R.
480	Orient	Orient Coke Co.	Uniontown, Pa.	Orient, M. R. R.
34	Parshall No. 1	Puritan Coke Co.	Uniontown, Pa.	Parshall, M. R. R.
168	Parshall No. 2	Puritan Coke Co.	Uniontown, Pa.	Parshall, M. R. R.
30	Perry	Perry Coke Co.	Pittsburgh, Pa.	Perryopolis, P. & L. E.
72	Plumer	Plumer Coke Co.	Uniontown, Pa.	Leckrone, M. R. R.-B. & O.
400	Republic	Republic Iron & Steel Co.	Youngstown, O.	Republic, M. R. R.
120	Rich Hill	Rich Hill Coke Co.	Outcrop, Pa.	Outcrop, B. & O.
350	Ronco	H. C. Frick Coke Co.	Pittsburgh, Pa.	Ronco, M. R. R.
86	Rose	Sunshine Coal & Coke Co.	Uniontown, Pa.	Bourne, B. & O.
373	Royal	W. J. Rainey	New York, N. Y.	Royal Works, P. R. R.
80	Sackett	H. R. Sackett Coal & Coke Co.	Smithfield, Pa.	Outcrop, B. & O.
378	Searight	Taylor Coal & Coke Co.	Uniontown, Pa.	Low Phos, M. R. R.
260	Shamrock	Fayette Coke Co.	New Salem, Pa.	New Salem, M. R. R.
100	Solon	Prospect Coal & Coke Co.	Uniontown, Pa.	New Salem, M. R. R.
310	Sterling	Consolidated C'ville Coke Co.	Uniontown, Pa.	Masontown, M. R. R.
400	Thompson No. 1	Thompson-C'ville Coke Co.	Pittsburgh, Pa.	Republic, M. R. R.
400	Thompson No. 2	Thompson-C'ville Coke Co.	Pittsburgh, Pa.	Republic, M. R. R.
305	Tower Hill No. 1	Tower Hill-C'ville Coke Co.	Uniontown, Pa.	Republic, M. R. R.
394	Tower Hill No. 2	Tower Hill-C'ville Coke Co.	Uniontown, Pa.	Republic, M. R. R.
500	Washington No. 1	Washington Coal & Coke Co.	Dawson, Pa.	Star Junction, B. & O.-P. & L. E.
500	Washington No. 2	Washington Coal & Coke Co.	Dawson, Pa.	Star Junction, B. & O.-P. & L. E.
76	Wineland	Banning Connellsville Coke Co.	Uniontown, Pa.	Fanning, B. & O.
70	Yukon	Whyel Coke Co.	Uniontown, Pa.	Yukon, P. R. R.

16,599

## UPPER CONNELLSVILLE REGION

120	Atlantic No. 2	Atlantic Crushed Coke Co.	Greensburg, Pa.	Bradenville, P. R. R.
60	Atlantic No. 3	Atlantic Crushed Coke Co.	Greensburg, Pa.	Bradenville, P. R. R.
50	Chester No. 2	E. A. Humphries Coal & Coke Co.	Scottdale, Pa.	Bradenville, P. R. R.
208	Connellsville	Latrobe-Connellsville Coke Co.	Latrobe, Pa.	Bradenville, P. R. R.
293	Derry No. 1	Latrobe-Connellsville Coke Co.	Latrobe, Pa.	Bradenville, P. R. R.
50	Derry No. 2	Latrobe-Connellsville Coke Co.	Latrobe, Pa.	Bradenville, P. R. R.
244	Duquesne	Bessemer Coke Co.	Pittsburgh, Pa.	Bradenville, P. R. R.
80	Fort Palmer	Westm'd-C'ville Coal & Coke Co.	Pittsburgh, Pa.	Fort Palmer, L. V. R. R.-P. R. R.
202	Graceton	Graceton Coke Co.	Graceton, Pa.	Graceton, P. R. R.
136	Latrobe No. 1	Latrobe Coal Co.	Altoona, Pa.	Latrobe, P. R. R.
50	Ligonier No. 2	Ligonier Coal Co.	Latrobe, Pa.	Derry, P. R. R.
53	Lockport	Bolivar Coal & Coke Co.	Pittsburgh, Pa.	Lockport, P. R. R.
136	Loyalhanna	Loyalhanna Coal & Coke Co.	Philadelphia, Pa.	Loyalhanna, P. R. R.
40	Marietta	Marietta-Connellsville Coke Co.	Connellsville, Pa.	Wilpen, L. V. R. R.-P. R. R.
160	Monastery	H. C. Frick Coke Co.	Pittsburgh, Pa.	Latrobe, P. R. R.
200	Old Colony	Greensburg-C'ville Coal & Coke Co.	Pittsburgh, Pa.	Ligonier, L. V. R. R.-P. R. R.
80	Saxman	Latrobe-Connellsville Coke Co.	Latrobe, Pa.	Latrobe, P. R. R.
71	Superior No. 1	Latrobe-Connellsville Coke Co.	Latrobe, Pa.	Latrobe, P. R. R.
167	Wilpen	The Shenango Furnace Co.	Pittsburgh, Pa.	Wilpen, L. V. R. R.-P. R. R.
300	Wharton	Wharton Coal & Coke Co.	Coral, Pa.	Coral Station, P. R. R.

2700

## GREENSBURG-CONNELLSVILLE REGION

57	Carbon	Keystone Coal & Coke Co.	Greensburg, Pa.	County Home Jet., P. R. R.
193	Donohoe	Donohoe Coke Co.	Greensburg, Pa.	Greenwald Station, P. R. R.
100	Huron	Keystone Coal & Coke Co.	Greensburg, Pa.	Dundale, P. R. R.
400	Jamison No. 1	Jamison Coal & Coke Co.	Greensburg, Pa.	Luxor, P. R. R.
516	Jamison No. 2	Jamison Coal & Coke Co.	Greensburg, Pa.	Hannastown, P. R. R.
491	Jamison No. 4	Jamison Coal & Coke Co.	Greensburg, Pa.	Crabtree, P. R. R.
40	Marthabel	Northern Connellsville Coke Co.	Connellsville, Pa.	County Home, P. R. R.
283	Salem	Keystone Coal & Coke Co.	Greensburg, Pa.	Allsworth, P. R. R.

2080



## DISCUSSION BY READERS

### Carbon Monoxide a Supporter of Combustion

In the present June issue of a contemporary, in answer to the question as to the correctness of two contradictory statements in reference to carbon monoxide supporting combustion, the editor states:

The statement quoted from the I. C. S. Instruction Paper that carbon monoxide does not support combustion is correct.

The contradictory statement was made in the first 1000 copies of "Examination Questions and Answers," but was corrected in all subsequent issues. A similar incorrect statement was made in some editions of "The Coal and Metal Miners' Pocketbook." Previous editions of the pocketbook stated that carbon monoxide is not a supporter of combustion. The statements that it is a supporter of combustion were made by a writer formerly in the employ of the publishers of "The Colliery Engineer," who, while an able mining writer, and as a rule accurate, in this instance expressed an opinion of his own, which is in direct opposition to the actual experience of chemical authorities whose works are regarded as standards all over the world.—EDITOR.

It is clear the above statement refers to me as being the author of the offending statement, viz., "carbon monoxide will support combustion," and the reference justifies a reply.

The quotations referred to are as follows:

It (carbon monoxide) is combustible, burning with a pale blue flame; but, by itself, does not support combustion.

I. C. S. Reference Library, Vol. 145, § 6, p. 2.

It (carbon monoxide) is also a supporter of combustion, being the only mine gas that burns and also supports combustion.

Coal and Metal Miners' Pocket Book,  
Tenth edition (1911), p. 350.

It (carbon monoxide) is combustible, burning with a pale-blue flame. This gas also supports combustion . . .

Examination Questions and Answers,  
First edition (1907), Ques. 312, p. 53.

The statement is not one of "opinion," but on the contrary one of *fact*; although it were better that, for mining students, it should be further explained. While carbon monoxide has no available oxygen and therefore cannot support the combustion of carbon, the gas (CO) will support an oxygen flame, which will burn in an atmosphere of pure carbon monoxide, although it would not burn in air. The statement, although correct, was modified later, at my own suggestion, in the I. C. S. coal-mining textbooks.

As I have often explained, the reason mine lamps burn even more brightly when in the presence of carbon monoxide (CO) is because the gas adds to the combustion going on in the flame of the lamp by adding a gaseous fuel to the hydrocarbons of the flame. The air, and not the gas, in that case, supports the combustion.

Any gas or substance that, through its own agency by virtue of its composition, renders the combustion of other matter possible is a "supporter" of that combustion. By combustion we understand any destructive chemical reaction between the constituent elements of two substances, and resulting in the formation of new products or compounds.

J. T. BEARD.

New York City.

### A Valuable Suggestion to Buyers of Mining Machinery

I was much interested in the Foreword of Feb. 15. I believe that the writer of that article had, unquestionably, the right idea. From the manufacturer's standpoint, all the plans and estimates made and engineering work done for various prospective customers, as well as for those who make inquiries from curiosity, must be charged to some account. In some factories, this becomes a serious consideration in the matter of costs, which must be added proportionately to the price of machinery. Considering now that six or seven manufacturers have all prepared plans and specifications for one inquiry, and, out of all these, only one can receive the contract, the balance must figure to recover on future sales what they have spent on these estimates.

Another matter of great difficulty is, as suggested in the article, that no competent engineer is employed by the purchaser of machinery, in a vast number of cases, the purchaser considering that by requesting bids and specifications for machinery he gets his engineering done for nothing. The variation in specifications on machinery by different manufacturers for the same installation is often startling. Equipment that will not stand long enough to warrant its being considered even a fair investment, is very frequently sold at a much higher price than high-class machinery that someone else has offered at a comparatively low figure.

Most purchasers will say that they want a plant to give lasting, uniform service, and, when the specifications arrive, they are incapable of judging what machinery will give them such service. They usually form their judgment largely by the little item at the end of the proposal, which states the price, and they purchase on this basis frequently to their own detriment.

Our universities are every year turning out young engineers in large numbers. The majority of these young men have a natural leaning and aptitude for this line of work, but, as the Foreword suggests, they become time-keepers, clerks or hold other similar positions in which their knowledge of engineering is not properly broadened, nor is their opinion, from an engineering standpoint, often requested by their employers. Many of these young men would have been as well off if they had taken a business course for \$60, instead of having spent several thousand dollars and four years of their time training for engineering and never having an opportunity to use the knowledge acquired. These young men should be given positions in which they can prepare drawings and specifications, after having investigated the conditions and ascertaining the requirements. In this manner, it would be possible to receive from manufacturers a uniform line of bids, and then prices would become a true comparison as to the quality of the machinery offered.

I believe it is the custom in Europe that when a buyer asks a manufacturer to prepare plans and specifications,

he agrees to pay for these on a basis of  $2\frac{1}{2}$  per cent. of the total estimate, irrespective of whether the bid is accepted or rejected. This places the various bids received on a more equal basis of comparison. In this country, the purchaser does not pay the  $2\frac{1}{2}$  per cent. for the plans and specifications submitted; but, in reality, he unconsciously pays six or seven times that amount.

I believe that if some system of this kind were adopted in this country, both the manufacturer and the buyer of machinery would be saved many thousands of dollars a year; and it would certainly eliminate the person who sends in inquiries merely as a matter of curiosity or for the purpose of ascertaining if he has been duped in some recent purchase of machinery. I would like to see this matter further discussed by those who are interested, and I believe much good would result from such a discussion.

O. H. BOHM,

American Contractor Co.

Joplin, Mo.

✱

## Systematic Timbering

Systematic timbering may be practicable where the conditions with respect to the roof and floor are regular; but, in many coal seams, the roof is fractured and there are fault lines and cross-slips in the roof that make it

✱

# Study Course in Coal Mining

By J. T. BEARD

## The Coal Age Pocket Book

**Height Due to Any Given Velocity**—Reversing the conditions of falling bodies and assuming a body is projected vertically upward with a given initial velocity ( $v$ ), it will rise to the same height ( $h$ ) from which it must fall to gain the given velocity. The same formulas are used in each case.

This is well illustrated by a simple experiment. The small tank of water shown in Fig. 1 is placed under a bell jar from which the air is then exhausted. The water was previously boiled to drive out the air, which otherwise would escape into the vacuum formed in the jar and destroy the accuracy of the experiment. As shown in the figure, there is provided at the bottom of the tank a spout turned vertically upward. When every provision is made to reduce the friction, the column of water that spouts from the tank will rise to practically the level of the water in the tank. As shown by the dotted lines, the height to which the water spouts decreases as the level of the water falls in the tank.

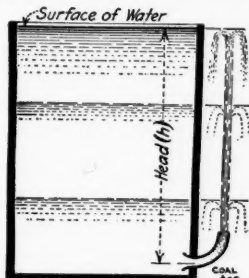


FIG. 1. SHOWING  
HEIGHT OF RISE  
EQUAL TO FALL

height equal to the distance of the point of discharge below the free surface of the water in the vessel or tank. This is called the "velocity of efflux" or the "velocity of discharge."

**Head-Producing Velocity**—The vertical distance of the point of discharge below the free surface of the liquid is the "head" producing the velocity of the discharge. Hence, the theoretical velocity of discharge for any given head is the same as the velocity due to an equal height, in the case of a body falling in a vacuum. This is one of the most important principles in the study of hydraulics.

**Pressure Head**—The pressure at the point of discharge is caused by the weight of water above that point. It is this pressure that produces the velocity of discharge. The head corresponding to a given pressure is called the "pressure head."

1.0 ft. water column = 0.434 lb. per sq.in. pressure;  
2.3 ft. water column = 1.000 lb. per sq.in. pressure.

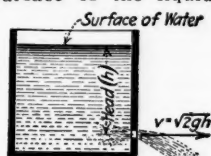


FIG. 2. HEAD ( $h$ )  
PRODUCES VE-  
LOCITY ( $v$ )

seem more advisable to set a post where it is needed, regardless of the regular distance apart. In this locality, the heavy pitching seams have been fractured by the very forces that disturbed the strata. The system of timbering employed here is irregular, being adapted to the varying conditions of the roof. In some cases, posts are set to prevent the bottom from sliding as much as to secure the roof.

The care of mine timber is a question of growing importance. Statistics show that three times as much timber is being consumed as is being produced by the forest growth. According to the U. S. Forest Service Bulletin No. 78, 1909, there are approximately 500,000,000 cu.ft. of mine timber in use in the United States, about 40 per cent., or 200,000,000 cu.ft. of which, it is claimed, can be advantageously treated, which would reduce this portion of the timber in use, to one-thirteenth of the quantity required, or say, 15,000,000 cu.ft. These figures are based on the estimated life of an untreated mine prop as being approximately three years; while, with proper treatment, it is claimed the life of mine timber may be increased to 13 years. The cost of mine timber per ton of coal mined makes the question of the preservation of timber an important factor. This cost, in 1905, in the anthracite region of Pennsylvania, was 8c. per ton of coal mined.

Coalmont, B. C., Canada.

J. W. POWELL.

✱

## The Coal Age Pocket Book

**Flow of Air and Water Compared**—Air and water are both fluids and as such the flow (theoretical velocity) in each case, is calculated from the head, by the law of falling bodies. The same head will produce the same velocity in air as in water, but the pressures are very different.

Water, at maximum density is about 815 times as heavy as the same volume of air, at normal temperature and pressure (60° F., 30-in. bar.). A given head of water column, therefore, weighs about 815 times as heavy as the same head of air column, and produces a pressure as many times as great.

Disregarding friction, the pressure required to produce any given velocity in a flow of water is practically 815 times as great as that necessary to produce an equal velocity in air. For example, a head of 400 ft. gives a velocity of  $v = 8\sqrt{400} = 160$  ft. per sec., which is the same for air as for water. The corresponding pressures, in each case, are

Water pressure,  $400 \times 0.434 = 173.6$  lb. per sq.in.

Air pressure,  $\frac{400 \times 0.434}{815} = 0.213$  lb. per sq.in.

It is important to note that the head must always be estimated as of the same density as that of the flowing medium.

## EXAMPLES TO ILLUSTRATE

1. To what height will a stone rise if thrown vertically upward with an initial velocity of 90 ft. a second, disregarding the resistance of the air; and what time will elapse before it again reaches the ground?

**Solution**—The height to which the stone will rise is the height due to its initial velocity, which is

$$h = \frac{v^2}{2g} = \frac{90 \times 90}{2 \times 32.16} = \frac{8100}{64.32} = \text{say } 126 \text{ ft.}$$

The total time of flight is double the time required to fall from this height, the time of rise and the time of fall being equal; therefore,

$$t = 2\sqrt{\frac{2h}{g}} = 2\sqrt{\frac{2 \times 126}{32.16}} = 5.6 \text{ sec., nearly}$$

Or, the time can be calculated from the initial velocity; thus

$$t = 2\left(\frac{v}{g}\right) = \frac{2 \times 90}{32.16} = 5.6 \text{ sec., nearly}$$

2. With what theoretical velocity will water be discharged from a hole in the side of a tank, at a depth of 10 ft. below the surface?

**Solution**—The velocity of discharge disregarding friction, is the same as the theoretical velocity due to that height; and is

$$v = \sqrt{2gh} = \sqrt{2 \times 32.16 \times 10} = 25.3 \text{ ft per sec.}$$

## INQUIRIES OF GENERAL INTEREST

### Foundation for New Headframe

A shaft 225 ft. deep is lined for the first 75 ft. from the surface with timber. The present headframe or derrick rests on sills above this timber lining. It is desired to erect a new steel headframe. The timber lining is not durable or substantial enough to support the new construction; neither would it support the surrounding ground, should the new headframe be built on foundations on either side of the shaft. It has been suggested that the new headframe must rest on concrete foundations set a considerable distance back from the shaft to afford a firm bearing. The size of the shaft is 8x18 ft., in the clear. The ground is soft and inclined to slip.

SUPERINTENDENT.

Steubenville, Ohio.

In reply to this inquiry, we cannot do better than to refer our correspondent to two articles, recently published in *COAL AGE*, one entitled "Steel in Mine-Construction Work," May 17, p. 757; the other "Modern Steel-Tipple Design," May 24, p. 786. Both of these articles explain in detail the great advance made in tippie construction since the introduction of steel for this purpose.

In the most recent designs in steel-tippie construction, the vertical columns have been replaced by inclined or spreading legs, forming a very substantial frame and making it possible to set the foundations at a considerable distance back from the shaft, so that the vibrations incident to the handling of the coal on the tippie are not transmitted to the shaft lining. This form of construction is known as the "A-frame" and very much reduces the vibration in the structure, which formerly interfered with the weighing of the coal on the tippie. This special form of construction is the result of a careful study and investigation of the requirements in coal-tippie design, by the manufacturers. Since its introduction, in the Middle West, this type of tippie has attracted considerable attention and, it is stated, continues to give satisfaction.

✱

### Tension of Water Vapor

Referring to the answer to the first question, under the heading "Air and Mine Gases," *COAL AGE*, Feb. 15, p. 275, I want to ask what is meant by the "tension of water vapor." Also, in the answer to this question, what does the number 0.3765, represent; and, in answer to the third question on the same page, what do the numbers, 0.6235 and 0.37 represent?

H. E. URSHINE.

Monongahela, Penn.

By the tension of water vapor is meant its elasticity; or, in other words, the effort exerted by the water vapor to expand. This expansive effort of a vapor or gas is always equal to the pressure that it supports. Some authorities use the word "pressure," instead of tension; but, correctly speaking, the tension of a gas or vapor is the effort it exerts to resist the pressure it supports.

In the calculation of the weight of 1 cu.ft. of saturated air, it is necessary to calculate, first, the weight of 1 cu.ft. of dry air, under a pressure diminished by the tension of the vapor, and add to this the weight of moisture in 1 cu.ft. of the air when saturated. In making this calculation for saturated air, the weight of the air, disregarding the moisture it contains, depends on the atmospheric pressure ( $p$ ) minus the tension ( $t$ ) of the water vapor; while the weight of the water vapor depends on the tension ( $t$ ) of the vapor, multiplied by its specific gravity (0.6235). The combined weight ( $w$ ) of the air and the water vapor it contains, therefore, is proportional to the expression  $(p - t) + (0.6235 t)$ , which can be written  $p - (1 - 0.6235)t$ , or  $p - 0.3765 t$ .

As just explained, the number 0.6235 is the specific gravity of water vapor, referred to air of the same temperature and pressure, as unity.

The number, 0.37, is the reciprocal of the weight of 1 cu.ft. of dry air at absolute zero (460° F.) and a pressure of 1 lb. per sq.in. This number corresponds to the number, 1.3273, which is the weight of 1 cu.ft. of dry air at absolute zero and a pressure corresponding to 1 in. of mercury. The weight of 1 cu.in. of mercury (32 deg. F.) is 0.4911 lb., and  $0.4911 \div 1.3273 = 0.37$ , which shows that these two constants correspond and will give the same result in calculation.

✱

### Calculation of the Specific Gravity of Gases

Kindly explain the method of calculating the specific gravity of gas, and why this does not correspond exactly with the actual specific gravity.

ROBERT SMITH.

Federal, Penn.

The specific gravity of any gas, referred to air of the same temperature and pressure, as unity, is calculated by first finding the molecular weight of the gas, which is the sum of the atomic weights of its elements. Thus, for marsh gas ( $\text{CH}_4$ ),  $\text{C} = 12$ ;  $\text{H}_4 = 4 \times 1 = 4$ ; and the molecular weight of this gas is  $12 + 4 = 16$ . Then, since the molecule of a gas is assumed to have twice the volume of an atom of hydrogen, at the same temperature and pressure, the density of the gas referred to hydrogen is one-half its molecular weight; or, in this case, the density of marsh gas is 8.

Air is 14.4 times as heavy as hydrogen, at the same temperature and pressure, and the specific gravity of a gas referred to air as unity, may, therefore, be calculated from its density referred to hydrogen, by dividing the density by 14.4. Thus, for marsh gas,  $8 \div 14.4 = 0.556$ , nearly.

The actual specific gravity of a gas, as determined by experiment, varies more or less from the calculated specific gravity, owing to inaccuracies of determination and impurities in the gas, but the difference is slight.



## EXAMINATION QUESTIONS

### Bituminous Firebosses' Examination in Pennsylvania, May 8, 1913

*Ques.*—If, while making an examination, you discovered explosive gas in the intake current of one of the splits in which 60 persons are at work, explain your method of procedure to protect the men.

*Ans.*—Assuming that the intake current contains a dangerous percentage of gas and that it is impossible to restrict the inflow of gas into the current, and, further, that to short-circuit the air current in an endeavor to prevent the gas from reaching the working face would create a dangerous condition where the men were at work, the only means left to prevent disaster would be to increase the circulation of air in the section affected, if this is possible. In the meantime, prompt notice should be sent in for the men to extinguish their lights and withdraw from that section of the mine. By sufficiently increasing the volume of the air current in that section of the mine, the percentage of gas would be reduced below the danger point.

*Ques.*—What provision does the act of June 9, 1911, make in regard to firebosses who neglect to comply with their duties, or who shall make false reports?

*Ans.*—The law specifies (Art. 5, Sec. 6) that for such neglect of duty or false report, the fireboss "shall be deemed guilty of a misdemeanor and shall be suspended by the mine foreman, and his name shall be given to the inspector for prosecution. If found guilty, he shall return his certificate of qualification as fireboss to the Department of Mines; provided, however, that he may again be an applicant for a certificate as fireboss, at any regular examination, after the expiration of six months; but if found guilty of a second offense, he shall return his certificate to the Department of Mines and cannot then be an applicant for reexamination."

*Ques.*—If a feeder of gas fills a large cavity in the roof of a heading, how would you keep the cavity clear?

*Ans.*—A special brattice should be erected so as to deflect the air current into the cavity in the roof. Such a brattice is generally arranged by stretching a piece of canvas across the heading a sufficient distance above the floor and inclined at a suitable angle to carry a portion of the air up into the cavity of the roof, so that it will sweep out the gas.

*Ques.*—If, while making an examination on a fall, your lamp became extinguished, how would you determine what gas or gases were present?

*Ans.*—It is difficult to answer this question without more exact information. The gas above the fall may be a body of pure marsh gas, the gas being given off in the roof and accumulating in the cavity as fast as it is carried off by the air current. In this case, the action of the flame in the lamp should betray the fact that it is undiluted marsh gas. On the other hand, this body of gas may be a mixture of carbon dioxide and marsh gas, formed under conditions that permitted these gases to mix together without the addition of air. Such a mixture

will extinguish the flame of a lamp, in a brief time. The mixture has been styled "flashdamp," because, when the lamp is first introduced into the gas, a cap is formed on the flame but almost immediately disappears, owing to the fresh air in the combustion chamber of the lamp being exhausted. The flame then dims and is extinguished by the gas, which enters and fills the combustion chamber of the lamp. The mixture of carbon dioxide and marsh gas is lighter than air and collects at the roof.

*Ques.*—How would you proceed to enter and examine a place supposed to contain firedamp?

*Ans.*—Proceed with caution, moving quietly and making frequent tests for gas at the roof. Care should be taken not to allow a thin layer of gas at the roof to escape notice. The gas should be slightly disturbed by blowing the breath against the roof, so that the gas will come down and reach the lamp. Every precaution should be taken to avoid walking into a body of gas, or passing under a layer of gas at the roof, without this being observed, until it is too late to retreat safely.

*Ques.*—Where are the gases that are generated in bituminous coal mines generally found?

*Ans.*—Gas is found, in all mines, in greatest quantity, either where it accumulates or in poorly ventilated places where it is generated. The accumulation of gas depends on the character of the gas and the strength of the air current circulating through the place. The tendency of marsh gas ( $\text{CH}_4$ ) is to accumulate at the face of rise headings, or at the roof, or on the "falls." The tendency of carbon dioxide ( $\text{CO}_2$ ) is to accumulate in swamps, or at the foot of dip workings, or at the floor or other low places and in poorly ventilated abandoned workings.

*Ques.*—Under what conditions would it be unsafe to fire shots in bituminous coal mines?

*Ans.*—It is always unsafe to fire a shot in a working place generating gas before carefully testing that and the adjoining places for gas. If the mine is dusty, the working face and the road, ribs and gob should be sprinkled thoroughly before a shot is fired. It is unsafe to fire a shot when the brattice has not been properly arranged or there is any derangement of the circulation by which an unusual condition is produced. It is generally unsafe to fire more than a single shot in a close working place of contracted area, since the heat, gas and dust generated by the first shot may be ignited by the flame of the second shot. It is always dangerous to fire shots facing each other, or to fire a shot depending on another shot that is expected to explode first. An entry shot, in blowing roof or bottom, should never be laid to face a strong air current.

*Ques.*—What is meant by the "head" in reference to air, water, or other fluids?

*Ans.*—The term head, as then used, is the vertical distance between the surface of the fluid and any given point below the surface. Whether the fluid is air, water or other liquid, the pressure, at any point below the surface, is equal to the weight of a column of that fluid extending from the given point to the surface.

## COAL AND COKE NEWS

### Washington D. C.

A revised form of the resolution for the investigation of the coal controversy in the West Virginia fields has been reported in the Senate within the past few days as follows:

Resolved, that the Senate Committee on Education and Labor is hereby authorized and directed to make a thorough and complete investigation of the conditions existing in the Paint Creek coal fields of West Virginia for the purpose of ascertaining:

First. Whether or not any system of peonage has been or is maintained in said coal fields.

Second. Whether or not postal services and facilities have been or are interfered with or obstructed in said coal fields; and if so, by whom.

Third. Whether or not the immigration laws of this country have been or are being violated in said coal fields; and if so, by whom; and whether or not there have been discriminations against said coal fields in the administration of the immigration laws at ports of entry.

Fourth. Investigate and report all facts and circumstances relating to the charge that citizens of the United States have been arrested, tried, and convicted contrary to or in violation of the Constitution or the laws of the United States.

Fifth. Investigate and report to what extent the conditions existing in said coal fields in West Virginia have been caused by agreements and combinations entered into contrary to the laws of the United States for the purpose of controlling the production, sale, and transportation of the coal of these fields.

Sixth. Investigate and report whether or not firearms, ammunition and explosives have been shipped into the said coal fields with the purpose to exclude the products of said coal fields from competitive markets in interstate trade; and if so, by whom, and by whom paid for.

Seventh. If any or all of these conditions exist, the causes leading up to such conditions.

Said committee, or any subcommittee thereof, is hereby empowered to sit and act during the session or recess of Congress, or of either house thereof, at such time and place as it may deem necessary; to require by subpoena or otherwise the attendance of witnesses and the production of papers, books, and documents; to employ stenographers, at a cost not exceeding \$1 per printed page, to take and make a record of all evidence taken and received by the committee and keep a record of its proceedings; to have such evidence, record, and other matter required by the committee printed; and to employ such other clerical assistance as may be necessary. The chairman of the committee or any member thereof may administer oaths to witnesses.

Subpoenas for witnesses shall be issued under the signature of the chairman of the committee or subcommittee thereof. Every person who, having been summoned as a witness by authority of said committee or any subcommittee thereof, willfully makes default, or who having appeared refuses to answer any questions pertinent to the investigation herein authorized, shall be held to the penalties provided by section one hundred and two of the Revised Statutes of the United States.

The expenses thereof shall be paid from the contingent fund of the Senate on vouchers ordered by said committee, signed by the chairman thereof, and approved by the committee on contingent expenses.

#### Divergent Opinions of the Supreme Court of Appeals

In the furtherance of its study of the West Virginia coal situation, the Senate has had printed two recent decisions by the Supreme Court of Appeals of West Virginia in the cases of *State ex rel. Mays vs. Brown* and others, in which careful attention is given to the action taken by the governor of West Virginia in establishing martial law in that state. According to the majority opinion in these cases:

As a result of these principles, views and conclusions, we have two areas or sections in the state, by virtue of a declaration of a state of war in the district, in which the powers of government and the rights of citizens differ most radically. The tremendous power of the governor in the military district does not extend beyond the limits thereof. Nevertheless, he is the governor of the peaceable territory of the state, and has such powers as are normally vested in him by the constitution and the laws, and any additional authority the legislature may have conferred upon him in pacific territory in the event of such exigencies, not violative of constitutional provisions. In the language of John Adams, the state has a peace power and a war power, both of which are now active.

We construe the returns of the respondents as asserting, for the purposes of this case, the power of detention of the petitioners, not a right to try them by a military commission. Having shown the existence of a state of war in the area covered by the governor's proclamation, and the steps taken to suppress the insurrection and lawlessness in that territory, the returns say the petitioners have been largely instrumental in causing and encouraging the lawlessness, riot and insurrection, and that their detention is, in the judgment of the executive, necessary in order to effectually suppress the same.

This sufficiently charges them with having willfully given aid, support, and information to the insurgents, the enemy, in a time of war, insurrection, and public danger, and Section 6 of Chapter 14 of the code confers upon the governor power to apprehend and imprison all such persons.

Such acts may be done either inside or outside of the mili-

tary district. Nothing in the terms of the statute limits the exercise of this executive power of apprehension and imprisonment to persons within the military district, and it is obvious that persons outside of such district may do as much or more than persons inside of it to defeat executive action looking to the suppression of the insurrection or rebellion. Hence there is no reason for such a limitation. On the contrary, there is good reason against it, wherefore we must say the legislature intended no such a limitation, and the statute contemplates such arrests and imprisonment of persons committing these acts outside of the military district.

The minority opinion in the same case as now issued by the Senate takes practically the reverse point of view, saying:

A clash between mine owners and miners cannot be considered public war, and the participants dealt with as enemies of the state. True, it is that in war the enemy, whether a foreign one or a rebel to whom the status of belligerent has been given, has no legal rights which those opposed to him must respect. But have either the mine owners and their guards on the one side, or the miners on the other assumed the status of belligerency against the state?

Because of warfare between themselves and violations of the law in relation thereto, has neither side any constitutional rights which the state is bound to respect? Nothing in the record justifies the conclusion that either the mine owners and their guards on the one hand, or the miners on the other, have lost their allegiance of the state by the unfortunate clash between them or by any other act.

Neither faction has made war against the state. Each time the militia has been sent to the district, all has remained quiet. Chief Justice Marshall early defined what it is to make war:

To constitute a levying of war, there must be an assemblage of persons for the purpose of effecting by force a treasonable purpose. (Ex parte Bollman, 4 Cranch, 75.)

Nothing even reminding one of treasonable purpose is involved in these cases. Yet the majority opinion deals with the citizens of the district as rebels. It deals with a part of Kanawha County as enemy's country. In this it cannot be sustained by reason of authority. Cabin Creek district has not seceded! The residents of that district are citizens of the state under its civil protection, though they may have violated the law. Because one violates the law, does he lose his legal rights? The guiltiest man, if he is not an enemy in public warfare directly against the state, is entitled to all rights as a citizen.

### PENNSYLVANIA

#### Anthracite

**Philadelphia**—G. C. Todd, special assistant to Attorney-General McReynolds, has presented to Judges Gray, Buffington and McPherson, in the Federal District Court, a decree to enforce the mandate of the highest court, cancelling the so called 65 per cent. contracts under which the large coal-carrying railroads purchase the product of small companies. This decree will not prevent coal companies, individually, from entering into the 65 per cent. contract arrangement with railroads, so long as they are not the result of a concerted plan or plot or in restraint of trade.

**Wilkes-Barre**—About 700 employees at the Westmoreland Colliery of the Lehigh Valley Coal Co. and 1000 employees at the Taylor Colliery of the Lackawanna Coal Co. are on strike because of the failure of some of their number to wear the union working button. It is reported that agents of the I. W. W. have been at work at Westmoreland, influencing the men to drop their allegiance to the United Mine Workers and ally themselves with the Industrial Workers of the World.

The 1500 employees in the coal-stripping operations of Contractor David Benjamin, in the Hazleton section, have been granted a substantial increase in wages under a three-year agreement, secured by the officers of the United Mine Workers of the Seventh District.

**Scranton**—The climax of this city's fight for surface protection comes with the march of citizens on the State Capitol in Harrisburg, to demand that the Senate pass the Davis Mine Cave bill and the Roney coal tonnage tax measure. Special rates have been obtained, and it is expected that more than 200 men will form the delegation. This demonstration promises to surpass any that has ever been made in this section of the state.

#### Bituminous

**Monongahela**—Over 600 men employed at the Gallatin and Manown mines of the River Coal Co. struck, May 26, because the company officials demanded that they work in entries with white powder and safety lamps. It is reported that the men have stated that they would not work with safety lamps and white powder in any entry as long as electricity is used in the mines. They claim that electricity is as dangerous as open lights.



## WEST VIRGINIA

**Charleston**—Governor Hatfield, of West Virginia, is exonerated on a number of charges circulated against him in connection with the West Virginia coal strike, in a report to the national committee of the Socialist party made June 3 by Victor L. Berger, Adolph Germer and Eugene V. Debs, who conducted a personal investigation.

**Sagamore**—The large and costly plant of the Buffalo & Susquehanna Coal Co., at Sagamore, was put out of commission and a loss of about \$15,000 was entailed by an accident, May 30, that has all of the earmarks of being the handiwork of vandals.

The coal train that visits the town daily had taken out all but eight loaded coal cars and put 30 "empties" in on the grade above the tippie. About two hours after the train had left there was a heavy crash of girders, and every one of the 38 cars was smashed up badly and piled under and about the tippie. The bottom pans, girders and much other skeleton work of the tippie being torn out.

Investigation showed that the cars had had their brakes properly set when they were put in. It is evident that some one opened the brakes and the cars started by their own weight. There is no clue as to the perpetrators of the deed. A wrecking crew from Galeton was called and has been at work clearing the tracks, but it will be some time before the tippie is put into shape to permit the resumption of work at the big operation.

**Wheeling**—Five hundred miners went on strike May 24 at the Loraine Coal & Dock Co.'s mine at Crescent, Ohio. In addition to this 400 workmen employed at the Enterprise Enamel Works, at Bellaire, Ohio, are also on strike.

**Morgantown**—The summer meeting of the West Virginia Coal Mining Institute will be held in Morgantown, June 24, 25 and 26. There is a desire on the part of the officials of the Institute that the coal men of the state get acquainted with the State University. It is believed that when the interests become aware of the excellent equipment of the school, so far as the college of mines is concerned, that they will take more interest in it and will begin the ground work of an important school of the state.

## OHIO

**Columbus**—The Ohio representative of the annual mining congress to be held at Karlsbad, Bohemia in July will ask for a six-hour day and a five-day week for all work connected with coal-mining industries. He will also ask for a uniform inside day wage scale, and proportionate advances for machine mining and also for a substantial advance on pick-mined coal.

It is said that Ohio coal operators will be drawn into the investigation to be made by the United States Senate Committee on Education by the labor people in West Virginia fields. Allegations have been made by the members of the committee that the operators in Ohio are interested in fomenting trouble in the West Virginia field.

Governor Cox, of Ohio, will soon take up the matter of naming the commission provided for in the Thomas resolution adopted by the Ohio General Assembly. This commission is to investigate the rate of wages being paid for coal mining in Ohio. The resolution was adopted to sidetrack the Green antiscreen bill, which had passed the Ohio Senate and was pending in the House of Representatives. Judge M. N. Donahue, of the Ohio Supreme Court, who was offered a place on the commission, refused to serve.

## INDIANA

**Indianapolis**—The Indiana wide entry law of 1907 is held to be constitutional by the Supreme Court of the United States. It provides that there shall be at least 2 ft. of space between track and wall, either on one or both sides, as a means of escape for miners in case of threatened collision or other accident to the cars. Veins 3 and 4 in the block field are exempt from the law. The penalty for violation is a fine not to exceed \$200, to which imprisonment may be added. The Vandalla Coal Co., in a test case, which it carried through the courts of the state, took it in final appeal to the highest court of the land, the judges of which decided unanimously that the law is constitutional. The company alleged it was discriminative and class legislation.

## ILLINOIS

**Springfield**—If the mine inspectors' bill, which is now in the State Legislature, becomes a law, the miners of Illinois will soon vote on each inspector by districts. Notices are to be posted at each mine, giving the date of the proposed convention to which each mine shall send a delegate. The delegate has a vote for every miner represented, so that two or three large mines in a district may by combination agree on a choice and force it on the others.

**Jacksonville**—A fire which started from spontaneous combustion of coal dust recently destroyed \$125,000 worth of property of the Royal Colliery Co., 1½ miles west of Virden. The upper works of the mine, with the exception of a one-story brick engine house, and the tippie and washery containing 100,000 tons of coal were consumed. Machinery in the tippie valued at \$17,000 was ruined. The fire started in the upper part of the washer building and had gained considerable headway before employees of the company on their way to start the night shift had discovered the blaze. None of the company's men were in the mine at the time. The upper works were recently improved at a cost of \$20,000, and the tippie, when constructed a few years ago, was valued at \$15,000. The cost of the washery was placed at \$50,000, and this spring new shaker screens were installed at a cost of \$10,000. The loss is covered by insurance. Six hundred men will be thrown out of work temporarily.

**Herrin**—One life was lost and another saved only by the use of an oxygen machine as the result of a fire which broke out May 22 in the mine of the Illinois Hocking Valley Washed Coal Co. The fire is still raging and the state rescue car has been called from Benton to aid in fighting the flames. The fire is believed to have started in the mule stable, where 17 animals were burned to death.

## COLORADO

**Denver**—The new coal mine inspection bill of Colorado has now become a law. Each coal operator is compelled to pay the coal mine inspection department ¼c. for every ton mined. It is expected that this will bring in a revenue of approximately \$24,000 a year. The expenses of the department will be in the neighborhood of \$15,000 to \$18,000, and the balance will go into the general fund of the state.

## IDAHO

**Kellogg**—The miners employed on Big Creek, at the Sidney Shonts lease went on strike May 19, demanding \$4 per day. They claim this is a scale that should be paid at all properties located on isolated spots such as the one at which they are working.

## MONTANA

**Lewistown**—Judge R. E. Ayers has named the following men to constitute the Board of Coal Mine Inspectors for Fergus County: P. H. Gilkerson, mine operator; A. H. Brew, coal miner; J. B. McDermott, state inspector.

## PERSONALS

R. M. Waugh, of Calvert, Tex., has been appointed general superintendent of the Southwestern Fuel Co.'s mines, located three miles north of that city. Mr. Waugh succeeds T. M. Reaverly.

J. W. Bishoff, chief engineer of the Davis Colliery Co., has been appointed acting general superintendent, in the place of J. F. Healy, general manager of mines, who has resigned. This appointment was to take effect June 2.

Martin Garvey, superintendent of the operations of the Davis Coal & Coke Co., at Thomas, Tucker County, W. Va., has resigned his position, to take effect June 1. It is expected that he will travel for eight months. After that time has elapsed, he will have charge of the coal properties in the state of Kentucky.

## OBITUARY

James E. Reese, foreman of Mine No. 6, at Albia, Iowa, was instantly killed while on duty May 28. Mr. Reese was using the telephone at the foot of a hill, when the tailrope on the ingoing trip broke, letting the cars run wild. Mr. Reese was struck and sustained a broken neck. He is survived by a wife and child.

T. S. Elwell, general manager of the Pittsburgh Coal Co., of Wisconsin, died May 21 at St. Mary's Hospital, in Duluth, following an operation for acute appendicitis. Mr. Elwell is a graduate of the University of Wisconsin Law School, and, for a number of years practiced that profession. The body has been taken to Minneapolis. Mr. Elwell is survived by a widow, a daughter and a sister.



## PUBLICATIONS RECEIVED

**Department of the Interior, Bureau of Mines:** Rules and Regulations to Govern the Coal Mines at Gebo, Wyo. Leased to the Owl Creek Coal Co. Thirteen pages 5½x9 in.

**Construction of Railroads in Alaska.** Hearings before the Committee on Territories, United States Senate, Sixty-third Congress, First Session. Part 7, dated May 12, 1913, pages 267-288, 5¼x9 in.

## TRADE CATALOGS

**The B. F. Goodrich Co.,** Akron, Ohio. Pamphlet. "Longlife" conveyor belt. Ill., 5½x8¼ in.

**The Watt Mining Car Wheel Co.,** Steel Mine Cars, Catalog "F", Second Edition May 1913. Nineteen pages 5½x7¼ in. illustrated. Also Catalog "B" Steel Ore Cars.

**The Star Electric Fuze Works,** Wilkes-Barre, Penn. Eight pages, 7½x9 in. describing and illustrating "Red Spitters" for blasting in Coal Mines. Also matter describing the "Liliput" shot firers battery.

**The Trimont Manufacturing Co.,** 55-71 Amory St., Roxbury (Boston), Mass. Catalog No. 77. 12 pp.; 5¼x6¾ in.; illus.

The above is a neat little catalog containing advance prices upon all goods (Trimont wrenches, etc.) put out by the Trimont company. It will be sent upon request.

## RECENT COAL AND COKE PATENTS

**Coal Drill**—J. G. Huntley, Pittston, Penn., 1,055,464, March 11, 1913. Filed Sept. 3, 1912. Serial No. 718,303.

**Coal Separator**—S. T. Pratt, Nanticoke, Penn., 1,058,259, Apr. 8, 1913. Filed Aug. 21, 1912. Serial No. 716,265.

**Improvements in Charging Gas Retorts**—Ritter-Conley Mfg. Co., 15 Exchange Pl., Jersey City. Filed in London. 6898 of 1912.

**Crusher Roller for Coal Breakers**—E. L. Clark, Scranton, Penn., 1,058,948, Apr. 15, 1913. Filed Aug. 5, 1912. Serial No. 713,210.

**Dump Car Device**—C. H. Doty, W. L. Burner and J. M. Wilcox, assignors to Kilbourne & Jacobs Mfg. Co., Columbus, Ohio. 1,057,413, Apr. 1, 1913. Filed Apr. 14, 1910. Serial No. 555,541.

## CONSTRUCTION NEWS

**Red Lodge, Mont.**—It is reported that the Northern Pacific R.R. is securing right of way for lines from Bridger to the Bear Creek coalfield.

**Seattle, Wash.**—The new coking plant, which is to be established at Seattle, is to cost in the neighborhood of \$3,000,000. The plant will employ from 300 to 600 men and will be a large consumer of Alaska coal.

**Catasauqua, Penn.**—The Lehigh Coal & Navigation Co. contemplates the erection of coal docks near Catasauqua for emergency use during flood periods. At present, anthracite is handled by docks at Mauch Chunk.

**Hazard, Ky.**—The Hazard Coal Co., has just contracted with the Roberts & Schaefer Co. to design and build a coal mining plant at Hazard, Ky. The new Marcus combination screen and picking conveyor equipment will be used.

**Birmingham, Ala.**—George B. McCormack and Erskine Ramsey and associates are planning to construct a byproduct coke-oven plant with a daily capacity of 1000 tons. It is estimated that the cost will be in the neighborhood of \$1,500,000.

**Astoria, Ore.**—J. C. Brooks, representing a large coal company in the Middle West, is investigating local conditions relative to establishing a large coal dock at this place. The

purpose is to provide coal for steamships coming to the Columbia River.

**Birmingham, Ala.**—The Sloss-Sheffield Steel & Iron Co. has awarded contracts for the construction of large concrete and steel coal washers at Flat Top and one at Brookside. The company will also build two washers at Russellville and four coal openings in the Brookside district. Altogether, about \$750,000 will be spent in the improvements.

**Wilkes-Barre, Penn.**—The Wilkes-Barre Colliery Co. has just begun operations at its electrically driven plant at Hudson. This is the only complete colliery so driven in the anthracite region. The apparatus was furnished by the Westinghouse Electric & Mfg. Co. Power is purchased from the Lackawanna & Wyoming Valley R.R. Co.

**Hazleton, Penn.**—The C. M. Dodson Coal Co. is installing at the Beaver Brook Colliery an electric hoist driven by a 300-hp. Westinghouse slip ring motor with magnetic control. The source of current supply is the Harwood Electric Co.'s plant at Harwood, Penn.

The Lehigh Valley Coal Co. is changing the Spring Brook Slope hoist from steam to electric drive. A 250-hp. Westinghouse alternating-current motor with liquid controller is being used to replace the hoisting engine.

**Whitesburg, Ky.**—A location for one of the many mining plants to be constructed by the Elkhorn Fuel Co., recently organized at Baltimore, has been selected at Kona, on the main line of the Lexington & Eastern R.R., at the mouth of Boone's Fork. Engineers are now starting on the preliminary surveys. Actual construction work will be started within a few days. Two other industrial cities will be built in the immediate vicinity. This development is expected to eclipse the large operations and developments of the Consolidation Coal Co.

**Portland, Ore.**—The Portland Council this week granted a franchise to the Northwestern Electric Co. to install a steam heating plant in the city and according to an announcement of General Manager W. E. Coman the pipes will have been laid and the steam turned on in the business district of the city by the end of the present summer. The company will use fuel oil in its furnaces and hence the installation of the plant will probably to some extent affect the local coal consumption, although a good many of the buildings that are counted on as customers are now using this fuel.

**Chattanooga, Tenn.**—The Cumberland Land Syndicate is planning the erection of a 60-oven byproduct coking plant in Chattanooga, at a cost of \$1,500,000. This plant will produce approximately 275,000 tons of coke annually, besides an immense quantity of gas for industrial, domestic and illuminating purposes. As yet no site has been decided upon, but it is rumored that the Cumberland Syndicate expects to use the 22,000 acres of coal land near Tracey City, recently purchased, for this purpose. Construction work will require approximately 15 months, and it is said that it will be at least 60 days before this can be started.

## NEW INCORPORATIONS

**Birmingham, Ala.**—The White Cross Coal Co.; capital stock, \$5000. Incorporators: John Kerr, T. H. Kerr, Lee Stone.

**Peoria, Ill.**—The Logan Coal Co.; capital stock, \$2500; to mine coal. Incorporators: J. M. Tyson, R. W. Peters, J. H. Kingsbury.

**Chicago, Ill.**—The American Fuel Co.; capital stock, \$10,000; mining coal. Incorporators: Frank Hajek, Frank Radons and Walter Baldwin.

**Chicago, Ill.**—The Eastman Coal Co.; capital stock, \$20,000; coal, coke, kindling wood, etc. Incorporators: C. W. Mogg, Freda Spears, T. H. Miller.

**Buffalo, N. Y.**—The Stickney-Price Coal Co.; capital stock, \$30,000; to deal in coal, wood, etc. Incorporators: S. W. Stickney, R. S. Price, G. A. Hughes.

**Scottsdale, Penn.**—The Round Bottom Coal Co.; capital stock, \$200,000; to purchase and operate 2000 acres of coal land in Marshall County, W. Va. J. W. Wiley, president.

**Louisville, Ky.**—The Big Four Magnolia Coal Co.; capital stock, \$20,000; to deal in coal and land. Incorporators: R. F. Harrison, E. J. Harrison and Paul Blackwood.

**Lex, W. Va.**—The Lex-Pocahontas Coal Co.; capital stock, \$2500; sale of coal and merchandise. Incorporators: J. H. Norman, Russell Mott, W. C. Haight, Paul Cortell and E. Landstrom.

**Logansport, Ind.**—The Citizens Coal & Gas Co. has been incorporated here, with \$10,000 capital stock, to deal in coal. The directors are, G. A. Linton, H. G. Williamson and W. L. Morris.

**Newton, Penn.**—The Saron Coal & Coke Co.; capital stock, \$100,000; to engage in the mining of coal and manufacture of coke. Incorporators: D. T. Vinton, W. R. Thompson, T. J. Bryant, E. Watts and A. E. Bush. Chief works to be located at White County, Ky.

**Buffalo, N. Y.**—The Commercial Coal & Supply Co., capital \$2500; directors, William A. Adolf, Henry C. Stone, a former coal dealer, and Peter Englehardt. The coal business of the late James Ash is incorporated under the name of James Ash, Inc., the directors being John G. Cloak and Charles F. Houck, executors of the estate, and Daniel C. Shearer.

## INDUSTRIAL NEWS

**Wellsburg, W. Va.**—T. C. Bane, of Short Creek, has sold half of his farm, 175 acres, to the McKinley Coal Co.

**Punxsutawney, Penn.**—W. J. McAninch, Joseph Knabb and others, have secured options on a large tract of land fronting the Sandy Lick, where they have secured siding privileges. They are now test drilling and expect to develop a deep seam of coal which has been found constant throughout the numerous drillings for gas.

**Connellsville, Penn.**—A seam of coal has been discovered at Rockwood recently, and preparations are being made to develop it and erect coke ovens.

**Pottsville, Penn.**—The actual work of stripping Broad Mountain for coal by the P. & R. has been started by Dick and Co., contractors of Hazleton.

**Shady Side, Ohio**—The shaft at the new Webb mine, of the Jones Coal Co., has been completed, and work on the inside of the mine is to be started at once.

**Minot, N. D.**—The site for a briquetting plant has been bought for some time and the machinery has recently been arranged for. This makes the plant practically an assured reality.

**Spokane, Wash.**—The International Coal & Coke Co., whose mines and offices are located at Coleman, Alberta, will distribute \$30,000 in profits, among its stockholders who were registered on May 20.

**Albia, Iowa**—The Harris Bros. are arranging to open their new mine on the Spencer farm, south of Hilton. They have a large tract of land to work and the enterprise will represent an investment of \$300,000.

**Connellsville, Penn.**—The Pittsburgh Coal Co. has purchased 300 acres of the Caldwell tract in Washington County. The consideration was \$82,500. The tract of land in question lies in Mt. Pleasant Township.

**Waynesburg, Penn.**—W. H. Brown, who recently bought 1344 acres of Greene County coal at Grays Landing, is expecting to develop his property during the fall. His Alitia plant of 400 ovens, on the river near Brownsdale, is in active operation.

**Detroit, Mich.**—The Solvay Process Co., of Detroit has bought the Spring Coal Co.'s property in the Pocahontas smokeless district of West Virginia, as an addition to its list of ten mines. The output is to be increased to 300,000 tons annually.

**Wichita, Kan.**—It is rumored that S. B. McClaren, a coal and lumber dealer, will establish two coal yards in Wichita this fall. Men are now at work erecting the sheds, the first of which is to be 14x130 ft., and the second, 20x58 ft. The buildings will be finished early in June.

**Coffeyville, Kan.**—A 6-ft. bed of coal is said to have been found at a depth of 292 ft. on the Sullivan farm, four miles south of Parsons. The coal was so finely ground that it is impossible to determine its quality, but there is talk of organizing a company to make a thorough test.

**Columbus, Ohio**—The Hocking Valley R.R. Co. has placed an order with the Ralston Steel Car Co., of Columbus, for 1000 gondola steel coal cars, to be delivered some time in the fall. These cars are to take the place of the 3000 30-ton cars sold by the road to a Northwestern railroad company.

**Windber, Penn.**—It is reported that the first coal has been extracted from the Loyalhanna new mine at Calrnbrook. This coal is being taken out through the tunnels put in for taking in empty mine cars when the mine is in complete operation. Scheesley & Sons, contractors, finished their work and left the job May 30.

**Hickman, Ky.**—Saad Salaamy, who has been in the coal business in this region for the past two years, has gone into business with J. T. Dillon. The firm will be known as the Independent Coal Co. They will install a large electric crane, with two 100-ft. towers, for conveying coal from barges on the river to their yards.

**Pittsburgh, Penn.**—The new coke-drawing machinery has been delivered at the Marianna plant of the Pittsburgh-Buffalo Co., on the Ellsworth branch of the Monongahela division of the Pennsylvania R.R. One thousand men are employed at present, but additional miners are being employed each day, and 200 more men can be given work.

**Coshocton, Ohio**—Members of the Ohio Coal Co., whose mines are located in the Tunnel Hill neighborhood on the C., A. & G. lines, held a business meeting in Coshocton recently. Extensive improvements have been made about the mines the last several months. The shipping facilities and output have been increased, houses built and other improvements made.

**Moundsville, W. Va.**—Attorney I. N. Kuhn, of Waynesburg, and J. W. Iams, of East Waynesburg, have just closed a deal by which Mr. Kuhn secures from Mr. Iams 521 acres of coal land located in Marshall County, W. Va. The coal is in two tracts, one lying near Limestone, and the other near the Panama mines on the B. & O. R.R. In partial payment, Mr. Kuhn has given a business property in Washington.

**Eldora, Ill.**—Mr. Reece, of Gillespie, Ill., has been in Eldora for considerable time investigating the coal fields in that region. His object was to become acquainted with owners of property where coal prospects exist. Later he will return and endeavor to secure option on the coal-bearing lands for the purpose of drilling. If successful, he will install machinery and at once begin mining operations.

**Los Angeles, Calif.**—It is rumored that the Standard Oil Co. of California is behind individual land seekers who are buying or leasing extensive properties in the Kern River district. It is pointed out that the company is already in the fuel, oil and asphalt business on an extensive scale, and the heavy variety of petroleum found in the Kern River field is needed by the concern's refinery in that section.

**Birmingham, Ala.**—Contracts have been closed with the Central Coal Co. to supply electric power for the production of coal at Kimberly No. 3, and Kimberly No. 1, which are located about 19 miles north of Birmingham, on the Louisville & Nashville R.R. The power will be furnished by the Birmingham Railway Light & Power Co., at a cost of \$50,000, approximately half of what it will cost the coal company to manufacture it itself.

**Battle Creek, Mich.**—For nearly six weeks the Grand Trunk R.R. has been unable to get coal from the mines in Indiana, and it has been necessary to use the largest part in the reserve dock in the Nichols yards. In view of the fact that the flooded mines are now dried out, the road intends to replenish this reserve coal supply which it has drawn upon. For this purpose 50 men are at work in the local yards unloading coal, and it is expected that several hundred tons will be required to refill the bins.

**Cleveland, Ohio**—The Kirk-Dunn Coal Co., with \$300,000 capital stock, contemplates developing 2000 acres of Ohio coal land on the Youngstown & Ohio River R.R., according to an announcement made recently. Interested in the new company are F. M. Kirk, Cleveland coal man, and W. H. Dunn, Salem coal man. The land lies in the neighborhood of East Liverpool and Lisbon, Ohio. The company expects to be operating extensively by autumn of this year. Its Cleveland office will be in the Williamson Building.

**Philadelphia, Penn.**—At a meeting of the directors of the George B. Newton Coal Co., the report of the president for the first six months showed earnings in excess of the amount necessary to pay a dividend on the first and second preferred stock, as well as a sufficient amount to take care of the sinking fund. In view of betterments and improvements to be made this summer, it was felt that the consideration of the dividend on the second preferred stock should be postponed until the end of the company's first year, in November.

**Colon, Panama**—The discovery of a high-grade anthracite coal has been made within 18 miles of deep-water transportation, in the Colon region. The discovery was made on the Rio Indio, which flows into the Caribbean, not far from the mouth of the canal. An area of 25 miles was surveyed and was found to be underlaid uniformly by a seam of coal from 2 to 4 ft. thick, running 85 per cent. carbon. Surveys, preliminary to the construction of a railroad, 80 miles in length, are to be started at once. This will bring the coal region into direct communication with the canal, where it can be loaded aboard ship.



## COAL TRADE REVIEWS

### GENERAL REVIEW

The demand for hard coal keeps up in all sections of the country, and the current month is expected to be an active one in the anthracite business. The loading out of New York harbor is notably slow, and stove still continues to be the shortest in supply. Naturally some of the sizes are beginning to drag with the approach of midsummer but as compared with previous years the situation is satisfactory in every respect.

The coastwise bituminous trade is showing an increase in strength as the season advances. Most agencies seem to be liberally supplied with orders, and the small buyers have now definitely abandoned hopes of lower prices. The market is firm all along the line, and in much better condition than ordinarily at this period of the year. The labor supply in the mining regions is short, and a slight curtailment in production on the part of a large number of operators would create an interesting situation to say the least. Loose tonnages are becoming more infrequent, due to a broadening in the market and a restriction in production, and this is, of course, creating a freer buying movement in the spot market.

In the Pittsburgh district indications point to a record-breaking business in the lake trade, while the market still continues strong in all branches; in the spot market most operators are demanding a premium over the season's circular for whatever free coal they have. Most shipments on contracts are being well kept up but there are occasional reports of an insufficient labor supply; were this condition remedied the movement would immediately become so heavy that a car shortage would develop. In adjacent territories practically no one is filling orders promptly, because there is insufficient coal to go around; reports are current that a number of large wholesalers have contracted for some tonnages that they are now unable to deliver.

There is an increasing demand for domestic grades in Ohio, which, together with the good steam trade, and a heavy lake business, has stiffened the market in every respect; every effort is being made to rush as large a tonnage as possible into the Northwest, and prices are being well maintained. Dumping at the Hampton Roads piers during the week has not been as heavy as was expected; producers, however, are holding their surpluses in a number of instances to apply on contracts which shortly become operative. The Southern market is as active as could be expected at this time, with a car shortage in some districts, as a result of which a number of mines are falling behind on their contracts.

Buyers generally in the Middle Western market still appear to be holding off in anticipation of a uniform break in prices, but indications in most districts are that the coming winter will see some new high records in quotations. The heavy shipments in the lake trade are reducing consignments on certain grades, with the result that a scarcity is developing in some few districts. The strong position of the Eastern fuels continues to be the main feature in the market.

### BOSTON, MASS.

**Bituminous**—Very little new business is heard from. All the agencies appear to be comfortably supplied with orders, especially on Pocahontas and New River. The smaller buyers are falling into line from week to week, having practically abandoned any hope of lower prices. The market is very firm and there is an entire absence of "cut" rumors. The first of June finds the situation in decidedly better shape than for many years at this season. Receipts at Hampton Roads are rather smaller than a month or two ago. The accumulation has all been moved and on account of short labor supply the daily output is somewhat diminished.

Georges Creek is slowing up on deliveries. Some of the transportation operated by Georges Creek interests has been diverted to loading other coals, in only a small way, to be sure, but yet it seems to signify a reduced output. A small decrease in each of a large number of operations will be sufficient to make things interesting again this fall and winter. Even at the high prices ruling it is no effort to place all the Georges Creek that comes down. The same is true of the better known grades from Pennsylvania districts. All-rail and up the line from the tidewater distributing points there is no perceptible change from a week ago.

Current quotations on bituminous at wholesale are about as follows:

	Clearfields	Cambria Somerset	Georges Creek	Pocahontas New River
Mines*	\$1.05@1.40	\$1.25@1.50	\$1.67@1.77	
Philadelphia*	2.30@2.65	2.50@2.75	2.92@3.02	
New York*	2.60@2.95	2.80@3.00	3.22@3.32	
Baltimore*			2.85@2.95	
Hampton Roads*				\$2.85
Providence†				\$3.73@3.78
Boston†				3.78@3.90

\*F.o.b. †On cars.

**Anthracite** is coming forward steadily on spring orders. The demand keeps up from all sections and June is expected to be an active month for hard coal. Stove is the size most in request although the demand for other grades is really more even than was expected. It is understood that a liberal share of the anthracite mined is being sent to other markets and if that condition holds for a few weeks the demand will continue to be somewhat ahead of the supply. Loading with most of the New York companies is notably slow, except on pea and buckwheat.

### NEW YORK

**Anthracite**—The hard coal business during May was just about equal to that of 1911, and, of course, far ahead of the trade during the same month in 1912, conditions then, being abnormal, due to the suspension in mining. The outlook for the summer is doubtful. Some companies are inclined to regard the situation rather optimistically, while others anticipate an abnormally dull market over the midsummer period. In general it appears that the trade is easing off slightly, although not more than what is normally expected at this time of the year.

Stove coal continues to be the shortest in supply, with Lehigh egg a close second; in fact most companies report all the prepared sizes to be in good demand. Pea and buckwheat in the steam grades are still the heaviest, some operators reporting that they are now putting these into storage, although others state that they have not yet found this necessary. While labor is short in the mining districts, the effects are not apparent on the shipments coming in, which are fully up to the usual amount for this time of the year. Car supply is excellent.

A further increase in the standard anthracite circular of 10c. per ton is now in effect, and we quote the New York market on hard coal as follows:

	Circular	Individual	
		Lehigh	Scranton
Broken.....	\$4.70	\$4.45@4.65	\$4.50@4.70
Egg.....	4.95	4.90	4.95
Stove.....	4.95	4.90	4.95
Chestnut.....	5.15	5.15	5.20
Pea.....	3.50	3.30@3.45	3.35@3.50
Buckwheat.....	2.75	2.15@2.45	2.50@2.75
Rice.....	2.25	1.70@1.95	2.25
Barley.....	1.75	1.35@1.70	1.60@1.75

**Bituminous**—A strong insistent demand for soft coal still continues at tidewater. There are no large stocks on hand, and requisitions on contracts are much heavier than usual at this period, with the result that there is a large tonnage moving.

The feature of the local market is the exceedingly heavy demand for gas coal. This is so far in excess of the supply that considerable of the business has been diverted to other grades, resulting in a material stiffening in the market all along the line. Another unusual condition is the lack of any reasonable explanation for the unusually large demand at this period of the year. It is obvious that there is a heavy consumption, but it is equally clear that this is not confined to any one particular industry, and seems to be entirely due to general industrial activity.

Companies are refusing to take any further new business, except at fancy prices, and spot business in the line trade is also much improved. Some contract buyers, accustomed to holding out for low prices, are beginning to find out that they are in a difficult position now. We continue last week's quotations with prices firm, and tonnages rather difficult to obtain on the following basis: West Virginia steam, \$2.55@2.60; fair grades, Pennsylvania, \$2.65@2.70; good grades of Pennsylvanias, \$2.75@2.80; best Miller, Pennsylvania, \$3.05@3.15; Georges Creek, \$3.25@3.30.



**PITTSBURGH, PENN.**

**Bituminous**—The market continues strong throughout, but as operators are well able to ship there is not much prompt business being placed. There is no uniform prompt market, some producers being willing to sell such free coal as they have at regular circular prices, while others demand a premium, and occasionally secure it. We note a sale today of 1500 tons of prompt at 10c. above circular prices. The supply of labor is somewhat scant, according to the opinion of some, but it remains a fact that necessary shipments are being made. The car supply is short only occasionally, but with a larger labor supply operators would probably try to get out more coal than they could secure cars for, and then the situation would be definitely called one of car shortage.

Lake shipments are heavy with all signs pointing to a record breaking tonnage this year. This does not mean that the Pittsburgh district is doing more than its share, but that there is general pressure for heavy Lake shipments. The slack market is quite irregular, as usual at this time, many operators selling for what they can secure, while others hold to the circular price of 90c. and store what cannot be sold. The lowest price done on slack this season is understood to have been 55c., and in extreme cases in the past week 60c. has been done, though 75c. would probably represent the average market for prompt slack. Operators are now quoting two prices on 1½-in. screened coal, \$1.55, the regular circular price put out months ago, for 1½-in. domestic, and \$1.50 for 1½-in. steam coal. Noting that prompt coal, except slack, frequently commands a premium of 5@10c., we quote regular circular prices as follows: Slack, 90c.; nut and slack, \$1.05; nut, \$1.25; mine-run, \$1.30; ¾-in., \$1.40; 1½-in. steam, \$1.50; 1½-in. domestic, \$1.55, per ton at mine, Pittsburgh district.

**Connellsville Coke**—The market remains quite strong in the face of a very decided lack of activity as regards new business, and it is quite evident that the operators are holding together on prices through faith, stimulated by the strong influence of banking interests, rather than through actual market conditions. Shipments against contracts are heavy, but have undergone a slight decrease in the past fortnight, due to the blowing out of a few blast furnaces. Prompt demand is extremely light, and is generally filled at concessions of 5@10c. from the usual asking price of \$2.25 for furnace coke. Negotiations for contracts for furnace coke are light, and some inquiries recently out have been withdrawn. Demand for foundry coke is only moderate, but prices continue to be held at a good premium over furnace coke, on account of the shortage of labor, which particularly affects the forking of cars. We quote prices unchanged: Prompt furnace, \$2.15@2.25; contract furnace (nominal asking) \$2.50; prompt foundry \$2.85@3.25; contract foundry, \$3@3.25, per ton at ovens.

**BALTIMORE, MD.**

The improved condition in the local market was maintained during the week, the demand for all grades continuing brisk and the price list firm; spot business was the feature of the market, especially in the line trade. Consumers depending on prompt delivery are buying more freely, while loose tonnages are becoming more infrequent, due to a broadening of the market and some restrictions in production at the mines.

The movement under contract continues large, with prices unchanged. In fact, a good healthy tone pervades the coal industry in this vicinity due to an unusual industrial activity, and operators are having difficulty in meeting the increased demand because of the labor shortage.

Shipments of gas coal to the Lakes have reached the highest point of the year, and this has tended to create a shortage of railroad equipment in the Eastern markets. As yet, this has not seriously interfered with operations, but indications are that it will gradually become worse and be even more acute than usual the coming fall.

**PHILADELPHIA, PENN.**

The anthracite trade is now past the first week in June, and comparing with the business during this month last year, which was the first full month that the mines worked after the suspension, the situation is said to look fairly good. Of course, some of the sizes are beginning to drag, notably the small ones, and egg and chestnut, but stove coal will carry the others along. All orders for this last size must be accompanied by some for the other sizes as well.

The market so far has shown almost a reversal of conditions, as regards the demand for stove and chestnut. It was the unprecedented call for the latter size some two years ago, which doubtless impelled the operators to advance the price to 25c. over stove, and the effect has been to drive some of the business that formerly was on chestnut, back to the stove size. At any rate, the market is hungry for stove, and the proportion of the orders is entirely at variance with the percentage of this size mined.

Tidewater business from this port seems to be the strongest feature of the market. The local trade is still going along at a jog trot, with nothing to boast of in either the demand, or the outlook for future business. As a matter of fact, the market is gradually approaching the season when conditions are generally sluggish. Of course, a comparison with last year during the summer months, cannot be considered, but as general rule curtailed work at the mines, and a stagnant condition of the market, usually prevails during the season now approaching.

The bituminous market has still to redeem itself. While there seems to be a slightly better feeling, its growth is slow, and action feeble, although the feeling seems to be general that, taking all in all, it is gradually growing better.

**BUFFALO, N. Y.**

The bituminous market is as strong as ever and bear members of the trade now content themselves by predicting that it will all go flat next fall. At present they need most of their time for hunting up coal enough to meet their demand. Practically nobody is filling orders promptly, for the reason that there is not bituminous enough to go around. There were long faces when the Decoration Day reports came in with notice of next to nothing done in the mines. Every effort was made to keep the miners at work, but with only partial success.

There are still a good many minor contracts making, all of which are quite satisfactory to the seller; one operator claims to be getting fully 15c. more than a year ago. There is much report of jobbers eastward who have taken big selling contracts without fortifying themselves at the mines and now they are begging for coal. One of them who used to buy all he could sell, and getting it at his own prices, is now paying as much for slack as he contracted to furnish mine-run for.

There is, therefore, no slackness in prices. Pittsburgh select lump is quoted at \$2.80, three-quarter at \$2.65, mine-run at \$2.55 and slack at \$2.15. Coke is less firm than coal and is quotable on the basis of \$4.75 for best Connellsville furnace.

The anthracite trade is steady, but consumers are well enough supplied to keep them quiet for sometime yet. Report has it that the Eastern coast trade is good enough to make it undesirable to crowd coal Westward just now except for storage against winter. Shipments of anthracite by lake for May, were 628,650 tons and for the season, 1,133,364 tons. For the same time last season the shipments were only 40,250 tons, owing to mining suspension.

**COLUMBUS, OHIO**

Activity still characterizes the coal trade in all the mining districts of Ohio. There is a slightly increasing demand for domestic grades, which coupled with a good steam trade and a heavy Lake business has the effect of making the market stiff in every particular. The tone is good and practically every one connected with the trade anticipates a good year. Prices are well maintained at the same level which has prevailed for the past few weeks.

The lake trade is still active, every effort being made to rush a large tonnage to the Northwest. The docks are taking care of the shipments in good shape and the congestion among the lake vessels is about over. Dock prices are well maintained and shippers in both the Hocking Valley and eastern Ohio fields are working as fast as possible. Some trouble over a car shortage is reported from eastern Ohio and as a result production in that district has been curtailed.

Railroads are taking a large tonnage, because of the increasing freight movement; many of the railroad contracts have been renewed although a few are still hanging fire. Steam contracts have been mostly renewed at higher figures than prevailed in 1912.

Quotations in the Ohio fields are as follows:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Domestic lump.....	\$1.50		\$1.50	\$1.50
¾-inch.....	1.35	\$1.25	1.35	1.30
Nut.....	1.20		1.25	
Mine-run.....	1.15	1.10	1.15	1.10
Nut, pea and slack.....	0.70		0.70	0.70
Coarse slack.....	0.60	0.70	0.60	0.60

Practically no labor troubles are reported from any of the Ohio fields; most of the strikes have been unimportant although a few have lasted for some time. As a result production has held up well with the exception of districts where the car shortage has affected the output. In Eastern Ohio it is reported at about 75 per cent. because of the car shortage. In the Hocking Valley it is about 90 per cent. and in the Pomeroy Bend field it is 60 per cent. of capacity.

**HAMPTON ROADS, VA.**

While dumpings at the tidewater piers have been good they have not been as heavy as was expected at the beginning of the week when there was a large fleet at all piers. Buyers have been offering \$2.85 to \$2.90 for spot or prompt coal during the week and while there have been some few sales, suppliers are not negotiating, preferring to hold coal now at tidewater for contract vessels about due. One of the large shippers over Lamberts Point has 19 vessels due during the month of June for foreign cargoes in addition to Coastwise contract business and it now looks as though the coal shortage will continue on into June unless the unrest at the mines is straightened out and the collieries worked to their full capacity.

Total dumpings for the month of May are not yet in but at Sewalls Point it will be around 280,000 tons, at Newport News about 295,000 tons, while Lamberts Point figures should run considerably over 330,000.

**LOUISVILLE, KY.**

The abnormal supplies of slack which have been offered during the past few weeks appear to have been absorbed, and the market for this grade is again in an approximately normal condition. As noted in a previous issue, this condition was due to a large railroad consumption, particularly in the Southern market. It now seems that these roads have acquired good surpluses, with the result that their demand has been materially reduced, and the supply of fine coal is again approximately normal. As a result of the excessive demand for the small grades, there was naturally an overproduction of lump coal, and a consequent falling off in prices. This, however, tended to stimulate the stocking-up so that no unusual surpluses accumulated.

As a result of the falling off in domestic consumption, due to the arrival of summer, eastern Kentucky producers generally find it difficult to obtain orders, and the trade is dull. Operators are now looking forward to the time when consumers will begin to stock up, with which business they will have to be content until the real winter demand opens up in the fall. It is not unlikely also that the labor situation in West Virginia may have a stimulating effect upon the local market; car supply in those fields is also reported as inadequate, and the combination of these conditions may prove to the advantage of the local market. There is some inquiry from Chicago and the Northwest, but this has not as yet resulted in a sufficient volume of business to materially affect the field as a whole.

The second-grade eastern Kentucky screenings are in light demand at 50 to 60c. f.o.b. mines, with the better qualities at 75 to 85c., and little moving. Western Kentucky fuels range about the same as the second-grade eastern Kentucky products, with 30c. being a fair average on pea and slack. Eastern Kentucky block is \$1.60 to \$1.70, block and lump \$1.50 to \$1.55, and round \$1.25 to \$1.35.

**DETROIT, MICH.**

**Bituminous**—The market generally is slightly duller than last week, due probably to the firm stand which the operators are taking in the matter of prices. Some buyers are undoubtedly holding off in anticipation of a decided slump before very long, while on the other hand one of the largest local wholesalers is credited with the statement that he expects to see the highest price level the coming winter this district has ever witnessed. It is generally conceded that many of the Ohio operators are already sold up to December and are now refusing to accept any further business at the prevailing circular.

The following is approximately the local market on soft coal:

	W. Va. Splint	Gas	Hocking	Carn- bridge	No. 8 Ohio	Poca- hontas	Jackson Hill
Domestic lump.	\$1.50	....	\$1.50	....	....	\$1.90	\$1.90
Egg.	1.50	....	1.50	....	....	1.90	1.90
1½-in. lump.	1.25	....	....	....	....	....	....
¾-in. lump.	1.15	\$1.15	1.15	\$1.15	\$1.15	....	....
Mine-run.	1.05	1.05	1.05	1.05	1.05	1.25	....
Slack.	0.80	0.85	....	0.50	0.85	....	....

**Anthracite**—The demand for hard coal in the local market is holding up well, and jobbers seem to have a better volume of business than they had anticipated. There has been no difficulty in disposing of all the coal coming in, and a number of orders for May delivery have been carried over into the current month.

**BIRMINGHAM, ALA.**

A canvass of the local situation shows that most of the producers consider the general coal market as active as could be expected for this season of the year. It is only in rare cases that orders are seriously needed and in almost every instance the mine that is short on orders has a poor grade of coal to offer. Where the coal is properly prepared there is

not much worry about disposition at a remunerative figure. In many instances, on the railroads where the car shortage is most acute, the mines are not keeping up with their contracts.

Regardless of how favorable other conditions may be, it is not believed that the outputs in Alabama can be largely increased until the labor situation is materially improved. Prices seem to have struck a level properly justified by consumption and production as there is little variation from week to week.

**INDIANAPOLIS**

The coal trade continues in about normal condition, with little to change the situation from week to week. There is a fair amount of the steam grades moving, all the factories continuing on a steady, if somewhat limited schedule. The delivery of domestic coal from the retail yards increased as the month of May advanced, consumers apparently having the idea that prices may increase. If no lift is given prices for June, that month is likely to see more than the average quantity of coal put in house cellars.

The following prices prevail:

Anthracite, chestnut.	\$8.00	Hocking Valley lump.	\$4.50
Anthracite, stove and egg.	7.75	Luhrig lump.	4.55
Anthracite, grate.	7.50	Luhrig washed egg.	4.75
Pocahontas, forked lump.	5.50	Cannel.	6.55
Pocahontas, shoveled lump.	5.00	Linton No. 4 lump.	3.20
Pocahontas, mine run.	4.00	Linton No. 4 egg.	3.20
Pocahontas, nut and slack.	3.50	Indiana washed egg.	3.50
Blossburg.	5.50	Brazil block.	4.00
Jackson (Ohio).	5.25	Indianapolis lump coke.	6.00
Kanawha lump.	4.50	Indianapolis crushed coke.	6.00
Kanawha egg, nut.	4.50	Connellsville lump.	7.00
Pittsburg lump.	4.50	Citizens' egg coke.	6.00
Raymond lump.	4.50	Citizens' nut coke.	6.00
Winifrede lump.	4.50		

**CHICAGO**

There is an exceptionally strong demand for smokeless coal in the Chicago market. A number of the larger buyers who have not obtained a sufficient supply on contract are buying freely in the spot market. A large amount of tonnage is being absorbed by the lake trade and, as a result, rail shipments to Chicago are light. A large supply of eastern Kentucky coal is being shipped here and sales are brisk. Hocking Valley prices continue to be strong, but comparatively little of this coal is being received here.

Dullness prevails in the spot market for Western domestic fuel. In anticipation of the harvesting season, a few orders have been sent for Brazil block and southern Illinois coal. A substantial increase in the number of orders for anthracite has been noted, although the general volume of business is far from heavy. As a result of the small production of lump, there is a strong demand for Western screenings. Low grade screenings command 80 to 85c., while the price for the high grades ranges from 85 to 90c.

Prevailing prices in Chicago are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump.	\$1.97@2.07	\$2.30@2.40	\$2.27	
Egg.		2.30@2.40		\$3.75
Steam lump.	\$1.82@1.87		2.07	
Mine-run.	1.77@1.82	2.20@2.30	1.97	3.30
Screenings.	1.62@1.67	1.95	1.57@1.62	

**Coke**—Connellsville and Wise County, \$5.25@5.50; by-product, egg, stove and nut, \$4.55@4.75; gas house, \$4.65@4.75.

**MINNEAPOLIS-ST. PAUL**

The coal business continues on the same slow and steady basis as heretofore this coal year. May was a sample of two extremes in weather. The forepart of the month was cold and rainy, and the retail trade was stimulated by small ordering of coal with which to keep heating plants a-going. The last week was the other extreme, with the thermometer registering as high as 90 degrees. A smaller amount of hard coal was placed with the consumer at the spring prices than usual, and it seems the early summer storage has become almost a negligible quantity in the Twin Cities and the Northwest. Dock prices have been adhered to at circular very closely and the senseless cutting in vogue last year, has not been in evidence except in a few cases.

**ST. LOUIS, MO.**

The past week saw some new records for low prices made, in both high-grade and cheaper coals. Standard mine-run sold down to 72½c., 2-in. lump 77½c., and 6-in. lump 85c. It is generally conceded that the cost of producing Standard coal is above 85c., on a mine-run basis, so if they continue to produce large enough tonnages, it is only a matter of time. On Carterville and Franklin County the low market was 95c. for lump and egg. Even in anthracite, on a jobbing basis it is being handled in St. Louis on a 5c. margin.

There is a scarcity of smokeless and very little moving in; the strike in the New River field threatens to cut off the local



supply, as St. Louis draws largest from that particular district.

The prevailing circular is:

	Carterville and Franklin Co.	Big Muddy	Mt. Olive	Standard
2-in. lump.....				\$0.90
3-in. lump.....			\$1.20	
6-in. lump.....	\$1.15 @ 1.20		1.25	1.05
Lump and egg.....	1.05 @ 1.15	\$2.25		
No. 1 nut.....	0.90 @ 0.95			0.85
Screenings.....	1.00 @ 1.10			0.80
Mine-run.....				
No. 1 washed nut.....	1.35			
No. 2 washed nut.....	1.20			
No. 3 washed nut.....	1.25			
No. 4 washed nut.....	1.25			
No. 5 washed nut.....	1.00			

St. Louis prices on June anthracite are: Chestnut, \$7.15; stove and egg \$6.90; grate \$6.65. Smokeless lump and egg is \$4.45 and mine-run \$4. Byproduct coke is \$5 and gas house \$4.75.

#### SPOKANE, WASH.

It is said that a big profit is made by the retailers in Spokane, and that the domestic trade could be served with Roslyn and Crows Nest Pass coals at about \$6.75 to \$7.25 a ton, according to the haul, and at about \$8 to \$8.25 for the Wyoming product, the difference in freight rates making the latter coal higher. There is said to be about \$1 difference in the cost of slack and mine-run and there is 25c. more duty on lump coal for family use from Canada than on slack, or steam. Prices at which steam coal is sold to business blocks are: \$5.25 for mine-run or \$5.75 to \$6.25 delivered. This coal costs at the mine in the Crows Nest district: Slack, \$2; mine-run, \$2.35 @ 2.35 and lump, \$3 @ 3.25 a ton. The latter retails at \$8.75 @ 9.25 f.o.b. Spokane. The freight rate on coal from the Crows Nest Pass district ranges from \$2.15 to \$2.25 a ton and the duty is 15c. on slack and 40c. on mine-run and lump. On this basis the lump coal costs from \$5.65 to \$5.80 laid down in Spokane, and as it is claimed that this must be screened, and the screenings sold at a low rate, this loss is estimated at about 25c. a ton.

Taking the benefit of this, the highest rate for Canadian coal is \$6.05 a ton. Owl Creek coal comes from the Northern Wyoming field and the freight rate is \$4.25 a ton to Spokane, but the Carney and Roundup coals draw a lower rate, the latter coming from Montana. The cost of Owl Creek at the mine for lump is \$2.75 and for nut \$2.25. Taking the highest rate, it costs \$7.20 laid down in Spokane. Southern Wyoming coal including the Rock Springs district costs \$4.80 freight and the mine cost is the same as Owl Creek, making it cost \$7.55 here.

## PRODUCTION AND TRANSPORTATION STATISTICS

### IMPORTS AND EXPORTS

The following is a comparative statement of imports and exports in the United States for March, 1912-13, and for the nine months ending March, 1911-12-13, in long tons:

	9 Months			March	
Imports from:	1911	1912	1913	1912	1913
United Kingdom..	13,067	5,911	7,451	50	96
Panama.....	1,240,937	729,582	1,061,379	104,346	107,016
Japan.....	7,474	12,885	42,657	5,578	440
Australia & Tasmania.....	228,003	159,720	112,158	10,324	10,141
Other countries....	4,717	1,501	3,289	57	32
Total.....	1,494,198	909,601	1,231,934	120,355	117,725
Exports:					
Anthracite.....	2,048,535	2,578,400	3,233,126	277,283	158,522
Bituminous,					
Canada.....	5,996,537	7,987,237	8,295,614	511,616	736,549
Panama.....	396,367	330,433	340,259	27,414	32,500
Mexico.....	491,490	235,493	264,537	24,119	57,629
Cuba.....	705,478	804,094	915,889	91,643	110,727
West Indies.....	385,708	505,769	456,013	63,075	53,308
Other countries....	459,968	774,316	741,597	255,259	99,230
Total.....	8,435,548	10,637,342	11,013,909	973,126	1,089,943
Bunker coal.....	4,763,429	5,124,183	5,377,041	671,052	582,129

### VIRGINIAN RAILWAY

Total shipments of coal over this road for April of the current year were 345,039 tons as compared with 280,995 tons for the same month last year. Shipments for the first four months of the year were: 1,578,283 tons for the current period and 1,195,600 tons in last year.

## FOREIGN MARKETS

### GREAT BRITAIN

May 23—Prices continue to show irregularity for prompt shipment. Smalls, particularly, are more abundant, with prices on the downgrade. Colliery owners are holding firmly for high figures for forward delivery, but buyers are unwilling to operate at the prices asked.

Quotations are approximately as follows:

Best Welsh steam.....	\$5.28@5.42	Best Monmouthshires..	\$4.74@4.86
Best seconds.....	5.10@5.22	Seconds.....	4.56@4.68
Seconds.....	4.92@5.04	Best Cardiff smalls.....	3.48@3.54
Best dry coals.....	5.04@5.28	Seconds.....	3.36@3.43

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport; both exclusive of wharfage, and for cash in 30 days—less 2½ %.

British Exports—The following is a comparative statement of British exports for April, and the first four months of the last three years, in long tons:

	April	1913	1911	4 Months	1913
	1912		1912		
Anthracite.....	29,793	235,650	766,219	587,797	937,166
Steam.....	1,086,312	4,708,475	14,631,510	10,132,535	17,317,543
Gas.....	266,486	983,697	3,203,899	2,205,484	3,593,943
Household.....	45,654	146,273	474,255	344,888	581,727
Other sorts.....	66,326	276,774	973,350	696,939	1,159,499
Total.....	1,494,571	6,350,869	20,049,235	18,967,643	23,589,878
Coke.....	11,081	70,200	310,909	288,204	352,390
Manufactured fuel	21,856	184,145	548,697	395,188	692,577
Grand total....	1,527,508	6,605,214	20,908,839	14,651,535	24,633,615

### GERMANY

Germany's coal production, imports and exports, for March and first three months of the current year were as follows:

	March	1913	Three Months	1913
	1912		1912	
Coal.....	12,811,823	15,413,278	42,021,723	47,558,449
Lignite.....	7,041,990	6,706,221	20,413,947	20,917,977
Coke.....	2,150,905	2,744,350	6,742,553	7,991,860
Coal briquettes..	356,336	462,014	1,222,190	1,436,225
Lignite briquettes..	1,652,904	1,627,304	4,519,710	5,048,260
Three Months				
Production.....	1312	1913	1912	1913
Production.....	42,021,000	47,558,000	6,743,000	7,992,000
Imports.....	1,899,000	2,177,000	132,000	140,000
Exports.....	7,595,000	8,460,000	1,305,000	1,699,000
Consumption.....	36,325,000	41,270,000	5,570,000	6,433,000

## COAL SECURITIES

The following table gives the range of various active coal securities and dividends paid during the week ending May 31.

	Week's Range			Year's Range	
	High	Low	Last	High	Low
<b>Stocks</b>					
American Coal Products.....	87	87	87	87	87
American Coal Products Pref.....	109½	109½	109½	109½	109½
Colorado Fuel & Iron.....	31½	30½	31	41½	30½
Colorado Fuel & Iron Pref.....	155	155	155	155	155
Consolidation Coal of Maryland.....	102½	102½	102½	102½	102½
Lehigh Valley Coal Sales.....	225	210	215	.....	.....
Island Creek Coal Com.....	52	51	51	.....	.....
Island Creek Coal Pref.....	85	84	84	.....	.....
Pittsburgh Coal.....	18	17½	17½	24½	17½
Pittsburgh Coal Pref.....	82½	80½	80½	95	79½
Pond Creek.....	22½	19½	19½	23½	19½
Reading.....	163	159½	160½	168½	152½
Reading 1st Pref.....	.....	.....	90	92½	89½
Reading 2nd Pref.....	89	89	89	95	87½
Virginia Iron, Coal & Coke.....	41	40	40	54	43
<b>Bonds</b>					
Colo. F. & I. gen. s.f.g. 5s.....	95	97	97	May '13	95 99½
Colo. F. & I. gen. 6s.....	107½	107½	107½	June '12	.....
Col. Ind. 1st & coll. 5s. gu.....	79	Sale	79	79½	85
Cons. Ind. Coal Me. 1st 5s.....	80	85	85	June '11	.....
Cons. Coal 1st and ref. 5s.....	94	93	93	Oct. '12	.....
Gr. Riv. Coal & C. 1st s.f.g. 6s.....	100	102½	102½	April '06	.....
K. & H. C. & C. 1st s.f.g. 5s.....	96	98	98	Jan. '13	98 98
Pocon. Con. Coll. 1st s.f.g. 5s.....	86	87½	86½	86½	87½
St. L. Rky. Mt. & Pac. 1st 5s.....	78	76	76	Mar. '13	76 80
Tenn. Coal gen. 5s.....	100	Sale	100	100	103
Birm. Div. 1st consol. 6s.....	101	103½	101	April '13	101 103
Tenn. Div. 1st g. 6s.....	102	102	102	Feb. '13	102 102
Cah. C. M. Co. 1st g. 6s.....	104	110	110	Jan. '09	.....
Utah Fuel 1st g. 5s.....	80	80	80	May '13	79½ 80
Victor Fuel 1st s.f.g. 5s.....	93	95	93	May '13	93 98
Val. I. Coal & Coke 1st g. 5s.....	93	95	93	May '13	93 98
<b>DIVIDENDS</b>					
Lehigh & Wilkes-Barre Coal—Dividend of \$3.25, payable June 17 to holders of record June 10.					



## FINANCIAL DEPARTMENT

### Consolidation Coal Co.

President J. H. Wheelwright of this company reports under date of Mar. 19, for the fiscal year ended Dec. 31 as follows:

**Bonds**—The following 5% 1st Ms. have been released of record and bonds canceled. Consolidation Coal Co. Kentucky Div., \$3,000,000; Somerset Coal Co., \$4,000,000; Clarksburg Fuel Co., \$2,500,000; Pittsburgh & Fairmont Fuel Co., \$1,300,000.

**Bonds in Sinking Funds and Pledged under First and Refunding Mortgage.**

	Pledged	In S.F.
Consolidation—4½% 1st M.		\$444,000
—4½% ref. M.	\$322,000	446,000
Coal Co.—5% 1st and ref.		95,000
Cumb. & Penn. RR. 1st 5%		x
Fairmont Coal Co. 1st 5%	189,000	694,000
So. Coal & Trans. Co. 1st M. 5%	486,000	14,000
Briar Hill Coal & Coke Co. 1st M. 5%		
Somerset Coal Co. 1st M. 5% of 1910	3,585,000	

x Sinking fund holds \$678,000 bonds of other companies.

Of the auth. issue of \$40,000,000 1st & ref. 5s. \$10,495,000 are held to retire underlying bonds, \$95,000 are in sinking fund, \$14,956,000 are held for future additions, improvements, etc., \$1,479,000 are in treasury and \$12,975,000 are held by public. [Compare convertible bonds below].

**Tonnage**—The tonnage produced by all mines of the company from 1912 was 10,347,100 net tons, compared with 9,219,731 net tons in 1911.

	Maryland	W. Va.	Penn.	Min.	Cr.	Elkhorn	Tot. Gross.	Tot. Net.
1912	2,162,996	4,576,484	1,748,091	522,900	228,011	9,238,482	10,347,100	
1911	2,178,391	3,925,329	1,671,639	456,544		8,231,903	9,219,731	

**Elkhorn Field**—The development work of the company in its 100,000-acre Elkhorn Field in Eastern Kentucky has progressed most satisfactorily. The town of Jenkins, on the eastern or Sandy Valley & Elkhorn Ry. side of the field now has a population of over 5000 people. The central power plant is now supplying all the power for the mines in the entire field, and these mines have been equipped with electrical haulage locomotives and electrical mining machines designed to cut this Elkhorn seam of coal.

Owing to the unusually high waters last spring, the construction of both railroads into this field was seriously delayed, and it was Oct. 1 before the Sandy Valley & Elkhorn Ry. was taken over for operation by the Baltimore & Ohio R.R. On the western side, the L. & N. R.R. was not completed until several months later, and the buildings are not so far advanced as at Jenkins, but some have been completed and a large number are under construction. The Louisville & Nashville R. R. Co. has ordered 3000 all-steel cars to take care of our output and they are now being delivered. The Baltimore & Ohio R.R. Co., for the Sandy Valley & Elkhorn Ry., has had built and delivered to that road 2000 all-steel cars, and we understand have an order for an additional 1000 all-steel cars in the process of being placed. Considering that the construction of neither railroad was commenced until April 1911, and the fact that their construction and equipment expenditures made and to be made are estimated at \$40,000,000 shows the desire of the railroad companies to reach this field as quickly as possible and the value placed by them upon the traffic originating therefrom.

It is our belief that the production this year from the Elkhorn field will be at least 1,750,000 tons. During 1913 miners' houses and other necessary buildings will be constructed so as to provide homes for the miners required to produce the increasing output of these mines.

All the important steel producers have built, or are building, by-product plants, and have, therefore, adopted this method of making coke. Several hundred thousand tons of our Elkhorn Coal have been used in the largest by-product plants and gas works in this country, and the coal has been found to be uniform in quality and analyses show only ½ of 1% in sulphur, 3% or under in ash, with only a trace of phosphorus. This is run-of-mine coal as it reaches the consumer and not an analysis of picked samples. By practical use, therefore, it has been proven an ideal fuel for by-product purposes, yielding a pure metallurgical coke, a large and rich yield of illuminating gas, together with the other resultant by-products, tar, etc.

**Outlook**—The conditions show an improvement over last

year and it is believed that the production of 1913 will greatly exceed the tonnage of 1912.

[The stockholders on Feb. 18, 1913 authorized the issuance of \$6,500,000 6% 10-year bonds convertible into stock at 105 prior to Feb. 1, 1922, and also an increase of \$6,190,500 stock, to take care of the convertible feature of the bonds. A public offering of the bonds was made in March. Pres. Wheelwright on Feb. 27, 1913, reported the company's total bonded debt as \$28,613,000, including \$11,645,000 "1st & ref. M" 5s. \$10,468,000 underlying issues and the \$6,500,000 new convertible bonds. He also reported the collateral for the new bonds as \$1,800,000 Northwestern Fuel Co. com. stock; \$500,000 Metropolitan Coal Co. stock, and \$6,500,000 Consol. Coal Co. 1st & ref. M. 5s, or their equivalent in cash, pending deposit of bonds. There are now listed on the N. Y. Stock Exch. \$16,345,000 1st & ref. M. 5s, which amount, we learn, includes \$4,605,000 of the \$6,500,000 which are to be pledged for the convertible issue.]

#### RESULTS FOR YEAR ENDING DEC. 31, INCLUDING SUBSIDIARIES

Tonnage—	1912	1911	1910	1909
Coal mined	9,238,482	8,231,903	9,370,633	7,325,123
Coke manufactured	62,647	43,740	96,692	62,441
Coal mined by lessees	536,401	473,008	524,858	466,087
Gross earnings (mining)	\$13,708,564	\$11,420,694	\$12,712,256	\$10,223,087
Operating expenses	9,896,157	8,467,662	9,186,013	7,144,567
Deprec. mining plant	247,508	221,618	251,410	206,647
Deprec. misc. equip't	95,284	78,999	59,607	68,491
Taxes	220,215	222,194	212,179	169,213
Interest and exchange	62,092	22,437	5,969	37,850
Insurance	39,424	41,803	29,306	25,140
Royalties	212,847	172,343	234,180	197,335
Total	\$10,773,527	\$9,227,056	\$9,978,664	\$7,849,243
Net earnings	\$2,935,037	\$2,193,638	\$2,733,592	\$2,373,844
Int. & divs. on sec. owned	811,853	311,431	197,848	277,815
Total income	\$3,746,890	\$2,505,069	\$2,931,440	\$2,651,659

Deduct—	1912	1911	1910	1909
Int. on Cons. Coal bds.	\$639,224	\$517,084	\$265,094	\$263,529
Int. on sub. cos. bonds	334,858	355,926	650,376	650,610
Sink. f.c. Cons. Coal bds.	162,958	153,618	108,950	79,930
Sink. f.c. sub. cos. bonds	106,492	94,605	194,444	165,631
Cash dividends (6%)	1,358,865	1,201,513	1,141,552	61,009,883

Total deductions	\$2,602,397	\$2,322,746	\$2,360,416	\$2,169,583
Balance, surplus	\$1,144,492	\$182,323	\$571,024	\$482,076

a Cumberland & Pennsylvania RR. depreciation amounting to \$108,230 in 1911, and insurance, \$3,544, is charged to operating expenses in accordance with Inter-State Commerce Commission classification.

b Also 60% stock dividend calling for \$6,150,000 paid March 1909 from accumulated surplus, the profit and loss surplus, including subsidiaries, on Dec. 31, 1909, after such payment being \$6,406,421.

#### COMBINED GENERAL BALANCE SHEET DECEMBER 31.

Assets	1912	1911	Liabilities	1912	1911
Property account			Capital stock	25,000,000	25,000,000
a. ....	47,918,32	45,255,105	Bonded debt	24,410,000	23,234,000
Adv. payments on coal land purch	1,355,855	1,145,763	Car trust bonds—assumed by C. & P. RR.	456,000	532,000
Due from 1st & ref. mtge. trustee	61,650,901	1,236,702	Pur. money oblig's	31,429	58,229
Stocks of allied cos.	3,636,888	2,846,688	Briar Hill C. & C. bds. retired June 1 '11 and June 1 '12	60,000	30,000
Other investm'ts	91,400	41,400	Bills payable	1,050,000	
Sinking funds	776,934	774,450	Accounts payable	833,767	779,319
Coal and coke	260,785	345,553	Pay rolls	308,805	282,250
Materials, supp., etc.	1,130,882	942,930	Royalties payable	205,953	186,044
Bills receivable	271,650	54,160	Bd. int. and divs. due	61,921	62,223
Accts. receivable	4,643,426	4,606,158	Bond int. accrued	246,686	243,293
Cash in banks, &c	971,401	1,231,856	Sink. fds. accrued	136,340	133,629
Cash for bond int. and divs. due	61,921	62,223	Div. pay. Jan. 31	375,000	302,158
Special deposits to cover royalties	205,128	185,110	Individuals and cos.	1,640,181	1,204,132
Special deposits for Elkhorn improv.		358,371	Profit and loss	8,159,416	7,039,192
Total	62,975,498	59,086,469	Total	62,975,498	59,086,469

a Property account (\$47,918,327) includes coal lands and other real estate, \$34,192,275; less reserve for exhaustion, \$2,507,086; balance, \$31,685,189; mining plants and equipment, \$14,333,781; less reserve for depreciation, \$2,635,803; balance, \$11,697,982; Cumberland & Penn. RR., \$3,271,450; less sink. fund for redemption of bonds, \$714,506; balance, \$2,556,944; Cumberland & Penn. RR.; equipment, \$1,832,626; less reserve for depreciation, \$523,174; balance, \$1,309,452; floating equipment, \$1,141,730; less reserve for depreciation, \$472,971; balance, \$668,759.

b For 75% of cost of improvements, extensions, &c., \$329,773; for expenditures on Northern Coal lands, \$1,261,127, and for Briar Hill Coal & Coke bonds retired June 1, 1911 and June 1, 1912, \$60,000; total, \$1,650,901.

c Stocks of other companies owned include 18,900 shares Northwestern Fuel Co. common stock, 2,700 shares Northwestern Fuel Co. pref. stock and 7,513 shares Metropolitan Coal Co. common stock.